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NEWSPAPER

Honeywell revamps net architecture

By John Dix

PHOENIX — Honeywell, Inc. provided a gateway to IBM hosts last week with a version of its network architecture and network processors said to improve connectivity.

Release 300 of Honeywell's Distributed Systems Architecture is compatible with, but also supersedes, DSA Release 200 unveiled in 1982 and the initial architecture announced in 1979. The latest DSA version is supported across the Honeywell line under the Gcos operating system.

Architecture improvements provide more communications channels and better management of terminals and secondary networks. These capabilities are realized with a gateway between DSA and IBM's Systems Network Architecture, three new Datanet 8 network processor models, associated operating system software and a release of DSA for Honeywell's DPS 6 family of small processors.

Although acknowledging the importance and need for the network flexibility provided by the Datanet 8 products, consultants said Honeywell's efforts to provide IBM compatibility lag behind those of other minicomputer manufacturers. Even with its improved architecture and new SNA gateway, "Honeywell is 12 to 18 months behind Digital Equipment Corp., [Data General Corp.] and [Wang Laboratories, Inc.]," according to Dale Kutnick, a consultant in Wayland, Mass.

Release 300 is a "natural phase in Honeywell's evolution of DSA to provide increased networking options" but lags behind other vendors, said Eric Killorin, president of Hyatt Research Corp., a research and publishing company in Andover, Mass.

The DSA/SNA gateway is based on a Honeywell DPS 6 mini running the company's

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IBM tackles new market, ties disparate systems

Vector processor takes aim at mid-range mart

By James Connolly

RYE BROOK, N.Y. — IBM dove into the supercomputer market last week, making a noticeable splash if not setting off a tidal wave.

The company introduced a vector processing facility for its 3090 mainframes and vector-processing-oriented software.

IBM spokesmen said the vector processor was not designed to compete with supercomputers from vendors like Cray Research, Inc. and ETA Systems, Inc. — computers offering performance of up to 2 billion floating-point operations per second — but analysts forecast that IBM's entry into the mid-range market, with a processor rated by the analysts at 50M to 100M Flops, means that IBM will go after the full market in the future.

IBM also announced the following:

- Earlier availability of its 3090 Mod-

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Profs versions boost link to Disoss network

By John Desmond

RYE BROOK, N.Y. — Forging a major link in its automated office concept, IBM moved last week to strengthen communications capabilities across its VM, MVS and DOS operating systems and diverse hardware devices. The firm announced versions of its Professional Office System that will allow editable documents to be exchanged with users of its Distributed Office Support System.

In a move to get mainframes involved in a task that has become the province of microcomputers — word processing — IBM also announced Displaywrite/370, a host-based version of its IBM standard word processing software.

The announcements fulfill statements of direction and mean that users in the growing VM world, the staple MVS world and the heavily populated DOS world can

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TOP OF THE NEWS

A Software International source said during last week's users group conference (see page 6) that within the next three weeks IBM will announce a new System/38 processor called the Model 60. The source, who works for the Software International division responsible for minicomputer applications products, said the Model 60 will support up to 512 users and will boast 32M bytes of main memory.

■

Hewlett-Packard President John Young was chosen late last week to be the keynote speaker at the computer industry's large trade show, the fall Comdex gathering. Young's address can be heard at 9:30 a.m., Wednesday, Nov. 20, in the main showroom of the Las Vegas Hilton Hotel. For a preview of Young's views, see *Computerworld*'s exclusive interview with the HP leader on page 15.

■

Fairchild Camera and Instrument will jump into the 32-bit microprocessor market tomorrow with the announce-

Continued on page 8

FYI

Premium benefits: Insurer collects from DBMS

By Charles Babcock

NEW YORK — Although many businesses have moved to centralized data base management systems during the last five years, few offer as dramatic a before-and-after contrast as does the State Insurance Fund, the largest insurance carrier in New York state.

Housed in an aging office building in New York's financial district, the State Insurance Fund provides workmen's compensation insurance to a third of the state's employers.

At the agency, MIS managers have accelerated payroll audit reviews, have shifted batch functions on-line and are working to improve cash flow to the agency by cutting seven days off the billing procedure.

These changes are all a result of the nonprofit agency's adoption of a central data base management system, from which it is just beginning to extract full benefit.

"We went from the horse-and-buggy days to the Space Age in five years," said Joseph E. Szymkiewicz, director of data and systems. With the host of applications that will be on-line for the first time this year and next, the State Insurance Fund will have converted 90% of its operation from stand-alone applications to DBMS, he said.

When Szymkiewicz was hired to manage the conversion six years ago, he inherited an agency that was using an IBM 7070 intermediate data processing system, a machine that was first issued in 1958. With no capacity to drive an on-line printer, the 7070's output took the form of punch cards or tape.

The DP staff "was completely demoralized. Our IBM 370 mainframe didn't know what a 7070 was doing. The staff thought the world had passed them by," he said.

The State Insurance Fund's approach was to retrain people rather than replace them. That may have slowed the process initially, but Szymkiewicz said it smoothed the way for DBMS changes by reducing employee apprehension.

In 1980, the state agency put its hardware needs up for bid, and the winner was Burroughs Corp. The agency installed a Burroughs 6807 that year, up-

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Apple forces rewrite of GEM

By Peggy Watt

MONTEREY, Calif. — Digital Research, Inc. bowed to pressure from Apple Computer, Inc. and agreed last week to revise and rerelease its Graphics Environment Manager system, which Apple charged was too similar to its own Macintosh interface and violated its copyrights.

No legal claim was filed, but the companies signed a formal agreement that also calls for Digital Research to pay Apple an undisclosed sum, provide some Digital Research programmers for Apple projects and let Apple review future GEM advertising, spokeswomen for both companies said. The companies also agreed to pursue some cooperative software ventures.

In question were GEM Desktop, GEM Paint and GEM Draw, which Apple said mimic the Macintosh interface, Macpaint and Macdraw. Apple claimed GEM as a whole was "substantially similar" to its Macintosh interface, according to Kathleen Dixon, a spokeswoman for Apple in Cupertino, Calif. Digital Research's cash payment is intended to compensate Apple for GEM advertisements that Apple claimed unfairly played on the program's similarity to the Macintosh.

Digital Research is required by Nov. 15 to phase out its first version of GEM, which was released in April and is characterized by the company as an operating system extension, and to replace it with another that meets Apple's approval. Digital Research also last week delivered a proposed second version for Apple's review.

The GEM system has been licensed to a number of personal computer manufacturers, who will also be provided with the new design as soon as possible, according to Nan Borrson, the Digital Research spokeswoman. Her company has shipped more than 30,000 retail copies of GEM Desktop and GEM Draw and some 500 tool kits for GEM applications.

Digital Research denied it infringed on Apple's copyright but agreed to the settlement in lieu of a long legal battle. "That's not where we want to spend our time and resources," Borrson said.

Borrson said GEM's user interface will remain much the same, but icon locations and other small aspects may be changed. The current version will be on dealers' shelves until the second release. Owners of the original GEM may opt for an upgrade, and all GEM applications will run under both versions, she said.

Apple persuaded International Microcomputer Software, Inc. of San Rafael, Calif., to change an early advertisement that likened its PC Paintbrush program to the Macintosh and Macpaint when PC Paintbrush first appeared in August 1984.

Likewise, Apple approached Mouse Systems Corp. of Santa Clara, Calif., when it released PC Paint about a year ago, said Barbara Marsh-Wetherell, marketing communications director. The program was deemed "different enough that there wasn't anything they could do."

Xerox Corp. holds copyrights on icons and other features of the Xerox Star, which is similar to the Macintosh interface but was introduced in 1981. The Xerox workstation introduced pull-down menus, multiple-display windows, bit-mapped graphics and a mouse, according to Xerox spokesman Don Ramsey. "We never felt it necessary to go after anyone" that had similar features, Ramsey said.

Layoffs persist in add-on, chip firms

By Clinton Wilder

The prolonged slump in both the semiconductor and computer peripherals industries continued to make its mark last week in the form of further cost cutting.

Motorola, Inc.'s Semiconductor Products Sector instituted a major layoff, and Intel Corp. announced a pay cut and furlough, while Control Data Corp.'s joint venture subsidiary, Magnetic Peripherals, Inc. (MPI), announced plans to close a disk drive plant employing 1,100.

Computervision Corp. also layed off 250 workers, including 180 at a 3½-year-old Sanford, Maine, manufacturing plant that will shut down next week and 70 in various worldwide locations. The Bedford, Mass., computer-aided design and manufacturing vendor laid off 950 employees in April.

Motorola will cut its Phoenix-based staff by 700 to 1,200 workers through various reduction measures. Approximately 200 positions will be cut at the semiconductor plant in Austin, Texas. In addition, the firm will trim its overseas work force in Europe and the Far East by 500 to 600 employees.

The cuts represent an approximate 4% reduction in the semiconductor unit's work force of 37,000. Earlier layoffs and other cuts had trimmed the division's worldwide staff by 17%.

In a separate move not resulting in layoffs, Motorola consolidated its Motorola/Four-Phase Systems, Inc. superminicomputer operation with its cellular telephone business in a new division, the General Systems Group, based in Schaumburg, Ill. Motorola Chairman Robert W. Galvin said the move was designed to merge computer-based expertise within the two units.

Intel pay cut

Santa Clara, Calif.-based Intel implemented a 4% to 8% pay cut, effective immediately, for its 14,500 U.S. employees. The company also will close its doors from Dec. 23 to 27 and give employees two unpaid vacation days, Dec. 30 and 31.

A spokeswoman said the measures were intended to avoid further layoffs. Intel laid off about 950 workers in June and another 900 last February.

MPI said it will close its Santa Clara plant, which makes disk drives for Sperry Corp., by next July, resulting in the dismissal of 1,100 employees. Sperry is a joint owner of MPI along with managing partners CDC, Honeywell, Inc. and French computer maker Groupe Bull.

MPI President Alvin Netten said Sperry is increasing its use of MPI disk drives made in Minnesota and phasing out the line made in Santa Clara.

National Semi posts $53.5 million loss

SANTA CLARA, Calif. — National Semiconductor Corp. last week reported a loss of $53.5 million, or 59 cent/share, in the first quarter ended Sept. 22.

The loss, which was expected, was by far the worst in the company's history. Sales plummeted more than $100 million from the same quarter last year to $423.4 million. National Semi brought in profits of $35.9 million, or 40 cent/share, in the year-earlier quarter.

National Semi's Systems Division, was profitable during the quarter. National Semi's weakest chip sales were to data processing and related businesses, while sales to military and automotive applications remained strong.

National Semi's revenue in the 16-week quarter showed a small decline from the previous 12-week quarter, when the company posted a modest $2.7 million loss on sales of $428.6 million. But the company said orders improved slightly across the board.

Intel Corp. is also expected to report a quarterly loss this Thursday, with other leading U.S. chip vendors expected to follow suit.

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CORRECTIONS

An unlimited-quantity site license for Borland International, Inc.'s Sidekick and Superkey programs costs $75,000 [CW, Sept. 30].

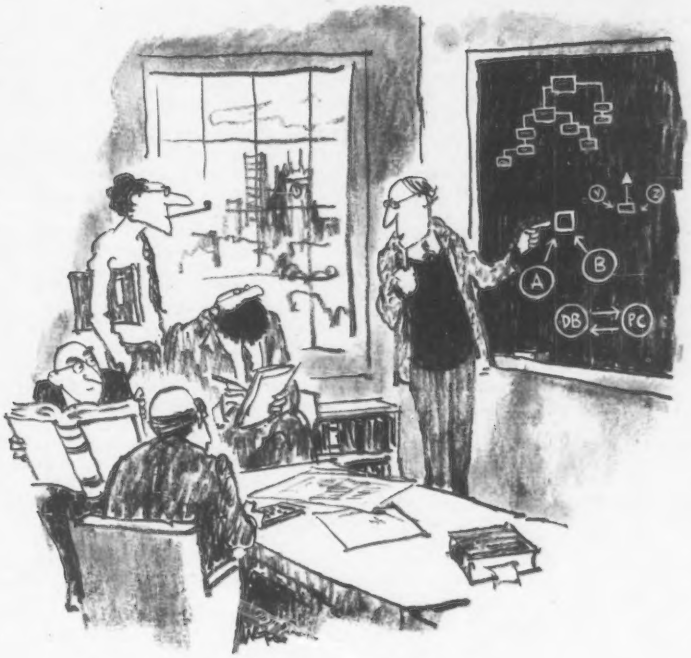
■

The updated version of the DB Vista data base management software from Raima Corp. [CW, June 17] can handle more than 16 million records per file, according to the vendor.

■

The first installment of the Hardware Roundup [CW, Aug. 19] included erroneous information supplied by NCR Corp. concerning its 9300 and 9400 mainframe systems. The correct million instructions per second (Mips) figures are 0.37 Mips and 0.67 Mips, respectively.

THE GREAT INFORMATION CENTER HOAX.



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Profs versions provide link to Disoss network

now all exchange revisable documents via Disoss.

Additionally, IBM products used in offices — 3270 terminals and Personal Computers; System/36 and 38 minicomputers; 5520 departmental processors; 8100 distributed processors; and 4300, 3080 and 3090 series mainframes — can now communicate via Disoss.

Last year, along with announcements of its Personal Services packages [CW, Oct. 29], IBM announced its intention to release Displaywrite/370. The Personal Services packages provide a common menu for electronic mail and calendaring functions.

Displaywrite/370 allows host-based word processing using IBM's Document Content Architecture (DCA). Users on 3270 terminals can create, revise, print and exchange documents with other IBM processors and workstations equipped with Displaywrite.

But the office systems picture may still be incomplete. "Almost every IBM distributed system now has somewhat consistent word processing and other office functions, and nearly all can act as a Disoss node," said analyst Frank Gens of International Data Corp. of Framingham, Mass. IBM needs to expand other office functions, such as graphics.

Profs and Disoss are often confused as competing products, Gens said. Disoss is a network application that controls communication between distributed intelligent office processors, while Profs is a host-based multiple-purpose application package along the lines of Digital Equipment Corp.'s All-In-One.

"IBM had to allow Profs users to participate in a Disoss network," Gens said, providing revisable DCA documents to Profs users, which the company did with the new Profs versions. Prior to the announcement, Profs users could only exchange final-form documents in the Disoss network.

On mainframes, Gens said, IBM had to provide consistency in office automation applications — the same word processing, electronic mail and calendar menus — across the DOS, VM and MVS operating systems.

For user Warren Kress, information center manager at Volkswagen of America, Inc. in Warren, Mich., the IBM Displaywrite/370 announcement presents a temptation. Volkswagen is planning to install 60 departmental computers at a rate of 15 to 20 per year and to provide electronic mail services to its users.

"It's tempting. With Displaywrite/370 on the mainframe, all the dumb terminals can now be used to do word processing and messaging," Kress said. "The temptation is to implement our electronic mail system all at once by putting it on the mainframe. That works, but it's a more expensive way to go."

This may be what IBM has in mind. Peter Lowber, director of information specializing in software and end-user computing issues at the Boston-based Yankee Group, said, "IBM is setting dead aim on 1986 as a good recovery year. The timing and delivery dates of the announcements are extremely aggressive."

For user Martin Ritchie, manager of the network application development support center at Boeing Computer Services Co. in Seattle, Wash., the Profs announcements offer consistency. "As part of our overall integration strategy, IBM is supporting our direction of integrating mail systems," Ritchie said. Boeing is using DIA/DCA protocols as the backbone of its network capability. With the latest IBM announcements, "we can bring Profs users into the fold," Ritchie said.

Profs Version 2, Release 1 is priced at $22,000 for 100 users or fewer and $32,000 for more than 100 users. Displaywrite/370 is priced at $14,000 for the MVS and VM versions and $6,000 for the DOS version. A Document Management/VSE Productivity Facility, which provides text editing, library services and document distribution to IBM 4300 DOS users, is priced at $2,850.

Displaywrite/370, a full-screen text editor for MVS, VM and DOS users, joins the Personal Services and Displaywrite products in the IBM Office Systems family. Displaywrite/370 also features spelling verification and correction, automatic hyphenation and an English synonym aid.

IBM also announced the Document Management/VSE application package, consisting of Displaywrite/370 and the Document Management/VSE Productivity Facility, to provide IBM Personal Computer and 3270 terminal users access to a 4300 processor to store and share documents.

Displaywrite/370 is scheduled to be available in February 1986; Profs Version 2, Release 1 in November; Profs Version 2, Release 2 in the third quarter of 1986; and Document Management/VSE in March 1986.

From page 1

Vector processor takes aim at mid-range mart

el 400 quadratic processor, from mid-1987 to the fourth quarter of 1986.

■ Vector processing software and supporting enhancements to the 3090's operating system software, MVS/XA and VM/SP HPO.

■ Main memory capacities boosted from 12M bytes to 16M bytes on the 4361 Group 4 and Group 5 systems, available in February for $242,000 and $279,000, respectively.

IBM declined to provide a Flops rating but said the facility can result in speeds of 1½ to three times faster than a 3090 without the facility.

However, analyst Frank Gens of International Data Corp. in Framingham, Mass., estimated that each vector processor allows a peak performance of 108M Flops and an average performance of 10M to 20M Flops.

The vector processor is field installable through hard-wire connections to the 3090's CPU. IBM said two facilities can be added to the Model 200 and four to the Model 400.

The unit is said to help the CPU process arithmetic and logical operations on rows or columns of up to 128 numbers in a single instruction. It adds 171 instructions for processing vectors.

Individual units have 16 vector registers containing 128 elements, each holding a 32-bit number.

Independent consultant Dale Kutnick of Wayland, Mass., said, "It would be useful to companies that can't afford a Cray or have one Cray and want to add the vector processing capability to their 3090."

Analyst Harry Edelson of Edelson Technology Partners in Saddle Brook, N.J., added, "IBM is going to move this up and down their product line. So you can bet that if they are not competitive with Cray or the Japanese companies in supercomputers now, they will be someday."

Scheduled to be available in February, the vector processing facility costs $370,000 for one and $600,000 for two.

New programs include the following:

■ Engineering and Scientific Subroutine Library (ESSL), a library of 95 mathematical and scientific subroutines.

■ IBM Fortran Language Conversion Program (LCP), to convert most Fortran Level 66 programs to IBM VS Fortran Level 77.

■ Vector Processing Subsystem/Vector Facility (VPSS/VF), to run programs written for the discontinued IBM 3838 array processor on the 3090.

The license charge for ESSL is $700 per month. There is a one-time charge of $28,000 for LCP and a one-time charge of $40,000 for VPSS/VF.

IBM also enhanced its IBM VS Fortran with Version 2, which is said to allow users to write assembly language instructions for the 3090 vector facility. Including a compiler, library and debugger, it will have a monthly license charge of $750.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

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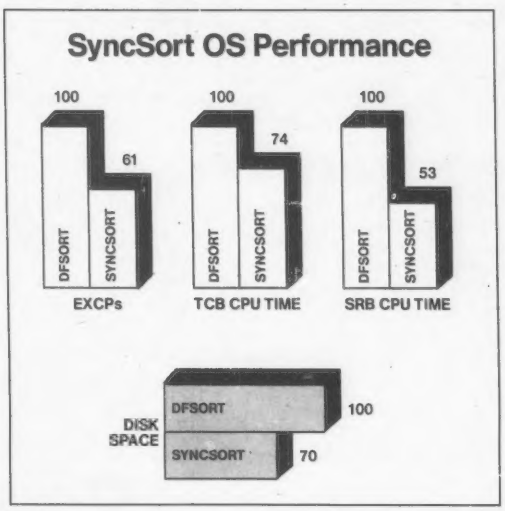

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Firm commits to bring line to non-IBM users

By John Gallant

WASHINGTON, D.C. — To appreciate the upbeat atmosphere at Software International Corp.'s 1985 users group conference last week, one had only to recall that just four years ago, it was not clear that the company would even be around at the decade's midpoint.

But Software International's darker days seemed all but forgotten last week. Company executives were celebrating user reception of the recently unveiled Masterpiece series IBM mainframe applications. And non-mainframe users seemed pleased with both the company's announcement of a similar application line for the IBM System/38 and with its commitment to migrate that software technology to its other target markets.

As the 1980s began, the vendor of financial and human resource applications was losing money and could not maintain the development pace set by competitors like Management Science America, Inc. (MSA) and McCormack & Dodge Corp. Software International was slipping to the back of the applications pack, and its survival was in doubt, according to Robert Healy, senior vice-president of marketing and planning.

But four years ago this month, the firm welcomed a savior in the form of General Electric Co., which purchased the Andover, Mass.-based company and has since made it a wholly owned subsidiary of GE Software Products Co. With the help of GE's financial and management resources, Software International's development and marketing efforts rebounded sharply.

As a result, Healy was able to stand before more than 700 users and sing the praises of the Masterpiece series of integrated applications — the fruit of a product strategy that rivals in scope the grand designs of industry leaders Cullinet Software, Inc., MSA and M&D. Thanks to GE and a $6 million development push, Software International, Healy claimed, has moved its product line back into the limelight.

But the company still has much to accomplish in the coming months. Software International has promised to deliver by year's end the Masterpiece versions of all its existing IBM mainframe financial applications. It has also slated a first-quarter 1986 delivery date for a new purchase order application and has hinted that it may later deliver a complete purchasing system.

Next year the company will begin a 12- to 18-month project aimed at isolating data base access logic from the applications code. Software International has further committed itself to separating the teleprocessing monitor logic from its systems some time in the future to give applications users more environment independence.

The company has assured its non-IBM mainframe users that it will provide Masterpiece-level functionality and integration in its applications for Wang Laboratories, Inc., Digital Equipment Corp., Hewlett-Packard Co. and Sperry Corp. processors.

Over the longer term, Software International must also decide whether to make commercially available a variety of productivity tools, both acquired and homegrown, which the company relied upon to develop its Masterpiece products.

As a sign of its commitment to its smaller machine users, the company used the conference to unveil Masterpiece/38 (see related story below).

The lag time involved in bringing product enhancements down into the small systems markets had been something of a sore point with users. But Richard Accurso, executive chairman of the Software International users group, praised the company's recent efforts to keep small- and mid-size system users from falling too far behind their mainframe brethren.

The recent computer industry slump has lengthened the software selling cycle, Healy said, and the company experienced lower than expected profits in August and September. But the firm's 1985 earnings have stayed on track, owing in large measure to cost containment steps taken early in the year and to the company's success in the smaller systems markets. Healy said non-IBM mainframe revenue is nearly 30% above target this year because of its success selling to the large installed base of minis.

"We had hoped for better economic conditions at the end of this development cycle," Healy said. "It is scary. But we know we are on the right track, and we just keep trying to look at the market with long-range glasses."

System/38 gets Masterpiece

WASHINGTON, D.C. — Software International Corp. promised IBM System/38 users all the functionality of its evolving mainframe Masterpiece series applications with the introduction of the Masterpiece/38 line last week.

Unveiled at its 1985 Users Group Conference here, Software International's Masterpiece/38 products are said to be built on the same Intelligent Architecture as their mainframe counterparts.

The Intelligent Architecture is designed to integrate the applications through common Help, screen navigation, query, security and micro-to-host link tools.

Included in the announced tools designed to work among the Masterpiece/38 applications are the following:

- Smart Link/38, a micro-host link that allows IBM Personal Computer users to selectively transfer data from and to a System/38. Data is automatically reformatted for popular microcomputer packages such as Lotus Development Corp.'s 1-2-3.
- Masterquery/38, a query and reporting package that allows users to access information across Software International applications.
- Master/Security/38, a security system that provides a single logon to multiple applications.
- Menu and Screen Navigation, a facility that allows users to move from screen to screen among applications.

Pricing for the systems ranges from $25,000 to $35,000, and current System/38 users will receive upgrades at no cost. Masterquery/38 and Smart Link/38 are priced separately at $7,000 and $3,500, respectively.

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Intel supermicro offerings extend 286/310 product line

PHOENIX — Intel Corp. will introduce today two series of supermicrocomputer systems building upon its 80286-based 286/310 product line.

Intel is emphasizing the upward mobility, software compatibility and open architecture of the products.

The 286/310 Advanced Processor (AP) is said to improve performance 80% over the existing 310 by substituting an 8-MHz 80286 processor with zero wait state for the 6-MHz processor in the 310 to perform more than 1 million instructions per second (Mips).

Intel also announced the 286/310 AP Extension (Apex) series of dual, tri- and quadprocessors, with performance claims ranging from more than 2 Mips to more than 5 Mips.

According to David R. Coffin, product marketing manager for Intel's Integrated Systems Operation, the Apex "multiple-CPU architecture is totally transparent to the application." Apex CPUs can be added to boost the performance of the 286/310 and 286/310 AP.

The products, based on Intel's adaptation of Microsoft Corp.'s Xenix, are compatible with Intel's Opennet local-area network and the firm's Idis data base information and office automation system.

Intel also announced upgrade kits for migration from the 310 to the new systems through board swapping or through installation of additional boards by Intel service representatives.

Coffin said the systems are the first in their price/performance class to use a microprocessor to control each subsystem. Theyuse Intel's 80287 math coprocessor to extend the instruction set of the 80286 in computation-heavy environments.

The 310 AP is available with up to 9M bytes of random-access memory (RAM), an integral 40M- to 140M-byte Winchester disk drive, an integral 320K-byte floppy disk drive and an integral 60M-byte streaming tape backup. It supports up to 16 users, according to Intel.

An entry-level, eight-user AP system with a 40M-byte hard disk is available now and priced at $11,200 in quantities of 50 or more. Upgrade kits for existing 310 users cost $4,995. Larger AP configurations will be available in December at prices ranging from $17,200 to $21,700.

The dual-CPU Apex with a 40M-byte hard disk drive starts at $16,500 in OEM quantities. An Apex upgrade kit lists for $6,995. The Apex-3 and Apex-4 will be available during the first quarter of 1986. A full Apex-4 with 1M byte of RAM and a 140M-byte hard disk drive, floppy disk drive and streaming tape will cost $35,000 in quantities and about $50,000 in single units, according to the company.

DEC loses patent violation suit

By Clinton Wilder

MAYNARD, Mass. — Digital Equipment Corp. suffered a rare defeat in a patent infringement case last week when a federal judge ruled that a C. Itoh Electronics, Inc. subsidiary's terminal does not use proprietary DEC VT220 technology.

Judge Frederick B. Lacey of the U.S. District Court of New Jersey denied DEC's December 1984 request for an injunction to block the sale of the CIE Terminals, Inc. CIT-220+ terminal. Lacey ruled that DEC had not shown sufficient evidence of copyright and trademark infringement by CIE Terminals and that it had not produced sufficient evidence that the sale of the DEC-compatible products unfairly hurt VT220 terminal sales.

While Irvine, Calif.-based CIE Terminals hailed the ruling, a DEC spokesman said the case may be appealed.

DEC suit draws counterclaims

In another unrelated patent infringement case brought by DEC, a Costa Mesa, Calif., vendor of DEC-compatible communications and storage products filed counterclaims charging DEC with antitrust violations, misuse of patents and predatory practices.

Emulex Corp., charged with infringement by DEC earlier this year [CW, July 15], accused DEC of "intending to lessen competition and create a monopoly in the peripheral market." Emulex asked a New Hampshire federal court to throw out DEC's charges and award Emulex treble damages for alleged lost sales as a result of the multimillion-dollar DEC lawsuit.

"We plan an aggressive effort to stop what we view as an illegal attempt by DEC to lessen competition in our marketplace," Emulex Chairman Fred B. Cox said in a statement. "We are most capable and well prepared to defend our right to continue providing competitive alternatives to DEC peripheral products," Cox's statement added.

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English-language interface out for 1-2-3

By Eric Bender

PASADENA, Calif. — An add-on package that permits Lotus Development Corp. 1-2-3 users to give commands and create macros in plain English has been rolled out by GNP Development Corp., a small software firm.

The Human Access Language (HAL) package, scheduled for shipment in December and tentatively priced at $295, lets users carry out standard 1-2-3 functions by typing straightforward English commands, GNP President Bill Gross said. Additionally, the package features an Undo command and creates transcripts that automatically log activity during a work session.

While GNP would not disclose names of any beta test users, one high-level developer at Lotus who looked briefly at HAL gave it high marks for both concept and execution. Applauding its ease of use, he also remarked on the difficulty of the 1-2-3 assembly-level programming required. "No one but a madman would get that deep into the code," he said.

GNP, which has offered 1-2-3 add-ons since last December, began work on HAL after finding that most users tap only a small fraction of the best-selling program's capabilities, Gross said. "There are people out there who think they're great with 1-2-3, have invested all that money in it and use it all day but have not really started with it."

Users may ignore 1-2-3 functions because they take too much work, Gross maintained. "Graphing is something that most people don't do, because there is so much setup required."

Designed for new, casual and experienced 1-2-3 users, HAL can handle words and phrases that people typically employ when working with spreadsheets, Gross said. Additionally, he said, users can add their own synonyms.

According to GNP, users can retrieve a file called "January Sales" by typing "get Jan sales." Rows can be deleted by typing "del this row." The package also responds to commands such as "sort by column X" or "give me a list of salespeople whose pay is > $40,000." Formulas can be entered in normal terms, such as "first quarter is Jan plus Feb plus March," simplifying the construction of financial models, according to the company.

By typing "total all," for example, users can produce a total for all columns in a work sheet much faster than they can by employing the regular 1-2-3 commands. Additionally, users can develop macros in plain English and modify existing 1-2-3 macros with HAL, according to Gross.

From page 1

Honeywell revamps network architecture

Distributed Systems Architecture/6 (DSA6) — which provides DSA for the small system — and Honeywell's SNA6 software. When fully configured, the gateway enables Honeywell terminal users to access IBM hosts, supporting up to 128 IBM host terminal sessions.

A gateway presentation facility is said to provide the necessary conversions between the Honeywell and IBM environments.

DSA/SNA components — which include presentation, facility and IBM 3270 terminal facilities — are priced individually and include initial and annual license fees that range from $95 to $855.

Honeywell has bolstered communications options within its own realm with three new models of its Datanet 8 communications processor, devices that can be configured as front-end processors, node switches, remote concentrators or any combination of the three.

The Datanet 8 supports half- or full-duplex transmission of asynchronous, character synchronous and bit synchronous protocols, including IBM's Binary Synchronous protocol and High-Level Data Link Control (HDLC) used in packet networks.

The entry-level Datanet 8/10 has a maximum of 31 ports, 1M byte of main memory, expandable to 2M bytes, and costs $23,900. The Datanet 8/20 has 8K bytes of cache memory to the 8/10's capacity, supports up to 127 ports and costs $38,000; it can also be expanded with an optional second processor. The high-end 8/30 also has cache memory, an optional second processor and a maximum memory capacity of 4M bytes. It supports up to 255 ports and costs $80,000.

The Distributed Network Software (DNS) for Datanet 8 has been enhanced with this release to provide support of IBM 3780 RJE terminals. The basic DNS 300 operating system software costs $560 per month and will be available with the Datanet 8 products in the second quarter of 1986.

At the low end, Honeywell has enhanced its DSA6 for use with its DPS 6 processors.

Release 3.1 of DSA6 is said to enable DPS 6 to communicate on a peer-to-peer basis with all other DPS family members.

In particular, this release provides a unified file transfer facility, support of a remote batch facility, a network administration facility and an optional network control facility. A bundled version of DSA6, including all facilities, will be available in November for $2,190 and a $1,000 annual license fee.

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TOP OF THE NEWS

Continued from page 1

ment of Clipper, an AT&T Unix System V engine featuring three 33-MHz chips on a module. The announcement at the International Conference for Computer Design will claim a Digital Equipment VAX-class peak performance of 33 million instructions per second and a 5-Mips average performance.

■

On-Line Software Internation-al will take a dramatic step in marketing micro-to-mainframe software next week, announcing a version of its Omnilink software with the mainframe portion offered for free. On-Line Software will charge only $495 per microcomputer for its new Free-Link product, according to Richard Granger, executive vice-president for marketing at the Fort Lee, N.J., firm, who noted, "It's a little outrageous — we're probably the first mainframe software provider to ever give the mainframe product away." On-Line had earlier priced the equivalent mainframe software at a minimum of $6,000.

■

One sideswipe victim of the shake-up at Apple Computer is likely to be the controversial television commercials for the Macintosh produced by California's high-powered Chiat-Day advertising firm. The commercials, broadcast during the last two years' Super Bowl football games, were championed by now-departed Apple Chairman Steve Jobs and Macintosh Marketing Director Mike Murray — and few others.

■

With IBM's purported Risc-based engineering workstation still in the wings, Digital Equipment was pleased last week to see one of its OEM customers announce marketing arrangements for bundled versions of the Microvax II. The customer is Tektronix, Inc., of Santa Clara, Calif., whose computer-aided engineering division said it will package its DEC VMS-based computer-aided engineering software with the Vaxstation and with the Microvax II. The Microvax II will also be serially interfaced with Tektronix's 4120 series color graphics display terminals.

■

Compaq Computer, which made its mark by deftly emulating (but not copying) IBM's PC-DOS operating system, has moved to prevent anyone from too deftly emulating the enclosure design of its portable computers. The company announced last week that the U.S. Patent & Trademark Office had granted a patent for the enclosure design to Ted Papajohn, manager of Compaq's industrial design department.

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Integration, coexistence stressed at Wang users meet

By Donna Raimondi

BOSTON — Integration and coexistence were the hot words last week at the annual meeting of the International Society of Wang Users. Meanwhile, a few blocks away, an independent Wang users group held its first exposition and national meeting.

Attended by more than 1,700 users, Wang's "Partners in Innovation" show stressed IBM compatibility, networking capabilities and the coexistence of various Wang products, such as the Office Information System (OIS) and VS systems interconnection.

VS users heard about the latest in operating systems; an increase, due in March, in the virtual address space from 2M to 16M bytes; and additional features such as security logging, audit trails and resource sharing.

Wang has committed itself to users of the full spectrum of its equipment, various speakers stressed, including the lower end OIS word processing systems and the vertical market 2200 — primarily sold by value-added resellers.

"Wang is concerned about how well or not well we have done letting the customer decide what he needs," Mark Detering said in his session on OIS/VS coexistence and migration. Users who feel that they are being driven out of their OIS systems into the newer VS line should rest assured that this is not so, he said.

Another reassurance for Wang users is that the company's 2200 system, primarily sold as a vertical market stand-alone system by value-added resellers, will be enhanced, upgraded and fully supported, said Gene Schulz, 2200 product manager and member of a special task force that has been set up by company founder An Wang to improve the product.

The OIS system is being unbundled to allow for more disk space and to allow the system to be configured with a customer's future VS system. The biggest news for OIS users is the company's direction toward interconnecting OIS and VS. VS capabilities can be brought down to the OIS user through a couple of schemes, the vendor said.

The first, based on Wang's Fastlan local-area network product, allows customers to add users or applications to the OIS system. The second scheme, based on the Wang Systems Networking product, allows remote connection of OIS systems to VS systems. For users who want to move up to a VS, a variety of local and remote connection packages allow OIS functions to run on the VS system.

Wang emulation of IBM's Systems Network Architecture (SNA) will be accomplished through software, not through black boxes, according to Bill Donovan, SNA emulation products manager. The emulator packages themselves have been available for two to three years, he said, but services and applications based on the emulations are still being developed or refined.

Down the street from the official company-supported users group meeting, a new organization kicked off its first national meeting. Index '85 was sponsored by Harry J. Berkley, the publisher of *VS News*, an independent magazine for Wang users that is often critical of Wang strategies.

Bob Daniels, a former Wang employee and previously a manager of the official International Society of Wang Users event, organized leaders of local Wang users groups around the country to support the new organization. As Wang gets more heavily into data processing and word processing, it will have to cooperate more with third-party vendors, Daniel said. "Wang hears the music, but it's taking them a little time to get the dance steps."

"We don't want to compete but to provide a channel of communication between users and third-party vendors that is objective and independent," Berkley said.

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IBM expands AT storage with 30M-byte hard disk

Second drive pushes storage to 60M bytes

By Eric Bender

BOCA RATON, Fla. — In a move seen as providing a natural extension of the Personal Computer AT line, IBM's Entry Systems Division last week launched a version of that machine with 30M bytes of hard-disk storage.

Functionally identical — except for the disk drive — to the existing 20M-byte AT enhanced model, the new system is priced $200 higher at $5,995.

Available this month, the new model can be expanded to 60M bytes by adding a second drive internally for $1,995. A 30M-byte drive also can be added to existing ATs for the same price. Built by IBM's Low-End Storage Independent Business Unit, the drive features the same 40-msec average access time as the 20M-byte device.

Response to competition

IBM "is just rounding out the product line," commented Egil Juliussen, chairman of Future Computing, Inc., a market research firm in Dallas.

"It looks like a response to the level of competition that's developing in the AT clone market," said Chris Christiansen of the Yankee Group in Boston.

While the new AT may find some applications as a single-user machine because users often fill up whatever disk storage is available to them, it may be targeted more toward roles as a multiuser system or a local-area network server, other analysts said.

Multiuser system

IBM is positioning the AT as a multiuser system, according to Tom Billadeau of TRB & Associates in Ogunquit, Maine. "Something that doesn't have at least 30M bytes isn't really a viable product."

Billadeau and Christiansen said that IBM will introduce a proprietary operating system for the AT rather than depend on its PC Xenix.

Among the possibilities are a closer derivative of AT&T's Unix System V, a multiuser version of IBM's PC-DOS and a downsized version of IBM mainframe software, the analysts suggested.

IBM also announced a 30M-byte version of the Personal Computer AT/370, available this month from the company's value-added dealers and branch sales offices. A model with 512K bytes of internal memory, a floppy disk drive and the new hard disk drive will cost $9,995.

From page 1

Insurer reaps benefits from DBMS

grading to two 6811s with tightly coupled memory in 1983 and then a Burroughs 7900H dual processor in April of this year. Both the 7900H and its predecessors, the two 6811s, offered the agency the ability to continue operating even if one CPU failed, Szymkiewicz said.

To implement Burroughs' DMS 2 data base management system, Szymkiewicz needed a core of experienced Burroughs programmers. Burroughs agreed to provide half of what he needed for the first year, so the agency added 12, all of them from Burroughs' Indian subsidiary, Burroughs Tata. The group took lower salaries than comparable American programmers, worked 60-hour weeks through the conversion period, including holidays, and all were fluent in English, Szymkiewicz said.

The group included Ramakrishna Eleswarapu, who would become the agency's director of systems and programming and would lead the design of its data base systems.

Eleswarapu designed three data bases, each containing data for a major operations area. One included data on 400,000 workmen's compensation policies, including premium billing; one included 1.5 million claims records; and the third contained data that had to be reported to the State Insurance Board for experience ratings.

"The design has to be such that it ensures future access to the information you need," Eleswarapu said. The task occupied most of a year for him and his three assistants.

Approximately 60 daily operations programs had to be converted to run against the data bases every day, with another 150 programs being used on a monthly, quarterly or yearly basis. During the last two years, the agency has been adding applications that improve operations instead of duplicating what the agency did with its 7070, Szymkiewicz said.

One such application allows a claims search based on the claimant's Social Security number rather than his name, which is often misspelled. "Since mid-February, we've been able to hit 75% of our claimants by Social Security number," Szymkiewicz said, which means a clerk can call up a claims file in 2 seconds.

Correcting names, which are frequently misspelled by doctors' offices and hospitals submitting insurance forms, used to be a batch process, leading to days of delay before a file could even be found. Now a claims examiner can correct a mistake as soon as it is discovered from an on-line terminal, Szymkiewicz said.

Until recently, an agency clerk examining a payroll audit had to make up a list of changes and hand it to a keypunch operator. With 120,000 audits a year, each requiring clerical adjustments, another tedious process was built into the system.

With another application under development, the agency will be able to process an invoice in one day instead of eight. Each day's delay stalls the cash flow to the agency.

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Execs gain chart, report access tools for CPUs, micros

By John Desmond

NEW YORK — Comshare, Inc. last week introduced a package of mainframe and personal computer software aimed at providing corporate executives a simple method of accessing reports and charts stored in mainframe data bases and applications.

The Commander Executive Information System (EIS), unveiled by the Ann Arbor, Mich.-based software and remote computing services vendor, runs in IBM VM and MVS mainframe environments and on the IBM Personal Computer XT and AT.

The Commander EIS package incorporates several existing modules of Comshare's System W mainframe decision support system (DSS) and two new products designed to ease access to reports and charts for the executive end user.

The new modules are W/Information Gateway, personal computer software that simplifies the end user's requests to the mainframe for reports, and its companion on the mainframe, W/Information Library, which stores reports to be accessed by Information Gateway. A third System W module, Communications, is needed to complete the Commander EIS package. The end user executes all Commander EIS functions from the personal computer.

Information Library can accept reports in final form from applications packages and fourth-generation language products, such as Information Builders, Inc.'s Focus, that can send reports to IBM VM/CMS files. At a later date, Information Library will be equipped to accept reports from IBM MVS/TSO files, a spokesman said. For reports from packages incompatible with those IBM operating systems, data can be extracted and sent to Information Library by MIS professionals, a spokesman said.

Information Gateway can be instructed to provide the most recent version of a report stored on a mainframe or for faster response, the most recent local version stored on the Personal Computer hard disk. Each copy of Information Gateway is priced at $450, and Information Library is priced at $22,500.

Features of Commander EIS include the ability to customize individual user menus on the personal computer, to access information by keyboard or mouse menu selection and to update automatically reports from multiple mainframes and data sources. Information Gateway features automated logon and the ability to incorporate popular microcomputer software packages.

For the DP professional, the EIS development system includes a full screen menu-building facility, graphics capability to chart mainframe and micro data and a range of communications protocols including asynchronous, bisynchronous and IBM's Systems Network Architecture/Synchronous Data Link Control for communication between the micro workstation and the mainframe. EIS offers multiple security levels to support distributed users and a facility for storing frequently used reports and charts on the workstation for fast display response.

Explaining the difference between Commander EIS and System W, Comshare President Richard L. Crandall said, "We're offering the executive access to whatever information he wants, and we're delivering it in a way that requires no documentation or training."

The price for Commander EIS on VM/CMS, available now, ranges from $89,500 to $198,000 for complete DSS configuration.

Existing System/W modules — ranging from $5,000 to $37,500 each — in Commander EIS include System/W Communications, providing for terminal emulation and file transfer through a number of different protocols; W/File Power data importer, which allows extract files to be produced from non-Comshare applications; W/Datman data manager, which puts data in a format necessary for producing reports to be distributed from Information Library; and W/Graphics for producing business charts and graphs.

Comshare, which reported $62 million in revenue at the end of its fiscal year, earns approximately 65% of its revenue from its remote computing service business.

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MSA estimates $10 million loss

ATLANTA — Management Science America, Inc. (MSA) recently said it anticipates a third-quarter net loss of $10 million or more and fiscal year profits significantly less than projected.

Yearly revenue is expected to be $28 million — $30 million including the quarter ended Sept. 30 — compared with $28.5 million a year earlier. Third-quarter expenses are expected to rise to $40 million, hence the expected loss, the firm said.

Third-quarter revenue was below forecast due mainly to customers delaying major purchases in economically uncertain times, the company said. Third-quarter expenses were driven up by an increase in marketing and advertising costs.

Gloria vs. DP centers: Hurricane wins in a TKO

By Charles Babcock

NEW YORK — Hurricane Gloria packed a muted punch but still closed many corporate computer centers in her path. Some that did not close voluntarily were knocked out, MIS managers on Long Island and in Connecticut said last week.

With winds of 130 mph while out at sea, Gloria could possibly have been one of the worst hurricanes of the century, but low tides and abating winds combined to reduce the feared tidal swells.

"We're right on Long Island Sound, and our parking lot is 6 feet above the high-tide mark. If the predicted 12-foot tidal surge had developed, part of our building would have been underwater," said Jack Welsh Jr., manager of management information systems at Bridgeport, Conn.-based Remington Products Corp., the electric shaver manufacturer.

No way to move mainframe

Remington operates a Sperry Corp. System 80 Model 8 mainframe on its ground floor and had no way to move it to a higher location before the storm hit. When Gloria struck, 30% of the trees in the city's Seaside Park next door were overturned, but Remington escaped unscathed.

In case he lost the computer, Welsh made arrangements to run his backup tapes at one of three nearby System 80 sites using the same operating system. In the event of a worse storm, Welsh said, he had plans to transport his data to a Sperry site in Hartford, Conn.

Conco Medical Co. in Bridgeport resorted to figuring its payroll by hand and planned to write out paychecks manually after the storm downed Conco's computer service bureau, Telecomp, Inc., in Milford, Conn., a spokeswoman said.

The service agency went down during the Sept. 27 storm and still had no lights, telephones or operational systems three days later. Telecomp officials could not be reached for comment.

Robert L. Klautzer, director of electronic data processing for U.S. Electrical Motors, a division of Emerson Electric Co. in Milford, had purchased new batteries for the firm's diesel generator prior to the storm. After power was lost during the storm, the generator powered computer operations, supporting three plants and five sales offices around the country.

The Dime Savings Bank computer center in Valley Stream, N.Y., on Long Island, lost its power supply early in the storm and had to turn to emergency generators to stay open. The bank closed its 26 branches on Long Island but wanted to keep its branches in the Albany, N.Y., region open, according to John J. Monaghan, executive vice-president.

The storm occurred at the beginning of Dime's end-of-the-month processing schedule, when interest and dividend computations have to be made on all accounts. "We were quite concerned we would not have a data center Friday," Monaghan said. Emergency backup tapes were stored off site, and the phone lines to Disaster Control, Inc., a disaster control firm in Ivytown, Pa., were tested prior to the storm.

Dime's branches in Valley Stream and Coney Island, N.Y., went off-line when they suffered water damage, but the bank's data center rode out the storm intact, Monaghan said.

At Computer Associates International, Inc., in Jericho, N.Y., the threat of a disk drive head collapsing onto a disk during a power outage was enough to prompt the firm's data center, with 100 Dasd units, to close before the storm struck, said R. Michael Williams, computer operations manager.

Walker cuts sales force

SAN FRANCISCO — Walker Interactive Products, Inc.'s recent consolidation of its sales force was its second major work force reduction this year. The company, which has been the subject of acquisition rumors during the past few months, is now left with 52 employees in its San Francisco headquarters, sources said.

Late last month Walker closed branch offices in Atlanta, New York, Chicago and Boston. In February, Walker trimmed its force almost in half, from 268 to 160.

According to Walker President Bruce Coleman, the move is expected to save the company approximately $500,000 a month, making October one of the firm's first profitable months in some time.

Walker is now going through "the last part of a cycle" that began three months ago when Coleman took the reins at the financial applications software company.

"We're in a position now where we don't have to get financing or be acquired," Coleman told *Computerworld*.

"By cutting back, we're trying to get as viable as possible."

However, Coleman added, "If there is an interest in a sale, we'll look at it."

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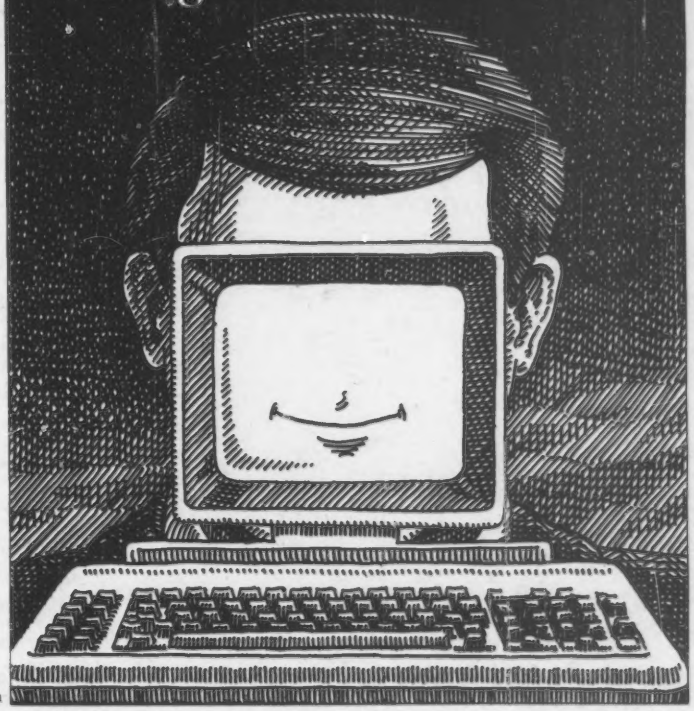

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IRS: Large firms to file on magnetic media

By Mitch Betts

WASHINGTON, D.C. — The Internal Revenue Service is stepping up its campaign to get large businesses to file their tax forms, such as the W-2 form on wages and salaries, on magnetic media.

The IRS recently proposed a regulation requiring employers that file 500 or more W-2 forms to use magnetic media, instead of paper forms, in 1987. Before the proposal becomes a final regulation, written comments will be reviewed by the IRS until Nov. 18.

Many of the businesses that will be covered by the regulation already file on magnetic media under a voluntary program, the IRS noted. The move to a mandatory program is required by tax legislation passed by the U.S. Congress in 1982 and 1983.

Smaller employers phased in

Gradually, smaller employers would be phased into the program as well. Beginning in 1988, employers filing 250 or more forms would have to use either magnetic media or machine-readable paper forms.

Although the proposed regulation applies only to returns filed after Dec. 31, 1986, the IRS announcement said filers are encouraged to begin using magnetic media as soon as possible.

The IRS said filing on magnetic media should be cost-effective for firms that have high-volume filings and computerized financial operations or access to a service bureau. Recognizing that magnetic media filing is not cost-effective for all firms, the IRS said hardship waivers will be approved for those "lacking both the necessary data processing facilities and access at a reasonable cost to computer service bureaus."

Unless a waiver is granted, failure to file a return on magnetic media would be dealt the same penalty as failure to file the return at all, the IRS said.

Before sending magnetic media, filers must first get government approval of the type and format of the media, the IRS said.

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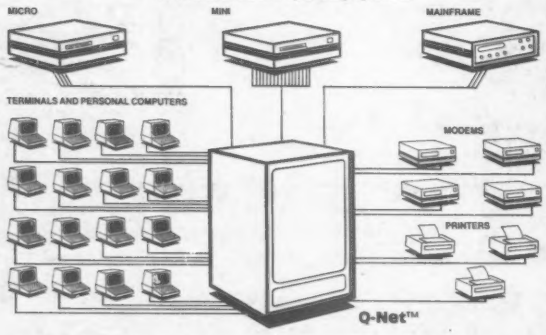

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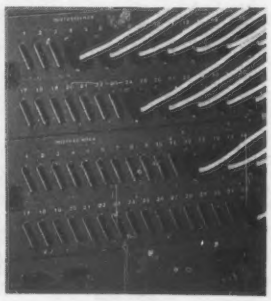

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WASHINGTON UPDATE
Bryan Wilkins
Mitch Betts

GSA speeds DP delivery

WASHINGTON, D.C. — Terence C. Golden, administrator of the General Services Administration (GSA), recently announced a new program — dubbed "Go for 12" — to speed up the acquisition of DP equipment for U.S. agencies.

GSA's Office of Information Resources Management will help other agencies get DP equipment delivered 12 months after budget approval, rather than waiting two to three years as is typical now.

The new approach is needed, Golden added, "to pull the federal government into the new century in handling its work load efficiently and economically."

Golden noted that private industry tends to use its data processing equipment for only 80 months, compared with the government's average of 121 months.

Carriers get rate cuts

WASHINGTON, D.C. — The Federal Communications Commission last week ordered local telephone companies to reduce by 8% their charges to long-distance carriers for connections.

At the same time, it approved an increase in a special category of access charges affecting private-line use, which will mean as much as a 15% increase in costs to users in some cases.

The cuts are not expected to result in lower rates for users, according to FCC officials, who said the carriers earlier this year absorbed increased connection costs but did not pass them on to users.

The FCC said the cuts will result in savings of $536 million to the carriers. At the same time, the FCC said it will maintain the authorized 12.75% allowed rate of return earned by long-distance and local-exchange carriers.

The biggest reason for the cost increases is the local telephone companies' decision to withdraw from the National Exchange Carriers Association (Neca) where access charges were averaged.

AT&T Communications told the FCC that its average costs for connecting to local exchanges that have withdrawn from the Neca pool will be 16% higher.

Mumps is spreading

WASHINGTON, D.C. — U.S. Rep. Fortney H. Stark (D-Calif.) considers Mumps an American success story. In this case, Mumps refers to the software language recently selected as a standard by the Veterans Administration for running its hospitals.

Stark praised Mumps software for being user-friendly, efficient and cost-effective.

"The cost of implementing this system, including hardware, through fiscal year 1985 is only $100 million, as compared with the $2 billion to $3 billion cost estimated by commercial firms," Stark said in a written statement.

NEWS

John Young speaks out on HP's 'risc'

AN INTERVIEW

I think there is some reason to be hopeful about the next period ahead, but I'm not anticipating some rapid turnaround in which we're returning to red-hot, double-digit growth rates.

I found myself making a sales call a few years ago to a Japanese customer and saying, "Well, I'm here with you representing Hewlett-Packard, a local company, right?" And he said, "Well, it's not a real Japanese company."

Hewlett-Packard Co. has one of the computer industry's oldest existing top-of-the-line products in its 12-year-old HP 3000 minicomputer line, but the company has not been a sleeping giant. Under President John A. Young, 53, the Palo Alto, Calif., firm is engaged in a companywide effort to develop products based on Reduced Instruction Set Computing (Risc) technology. The effort, dubbed Spectrum, is effecting fundamental changes in the organizational structure established by legendary founders William Hewlett and David Packard, but Young maintains that the original HP corporate vision remains intact.

In an interview with *Computerworld* Staff Writer Clinton Wilder and Executive Editor Sharon Frederick in New York last month, Young discussed Risc and Spectrum and other issues.

How did the concept of Risc, as a long-term strategy for HP, evolve within the company?

We had a different problem than a lot of people had. In the computer area, we had desktops with one architecture, factory floor terminals with another and the HP 3000 with yet another stack architecture. And the 9000 series terminals emulated the 3000 architecture in some ways but not really completely.

We found we spent about 90% of our time changing things to get the networking to work out. And all those changes propagated down the whole line.

I just decided, when I became president seven years ago, that our architectures were aging, but we needed to do more than just perpetuate these things — we wanted to find some way of bringing a harmony out of this unique business opportunity.

We needed to make a jump, and the conjunction of all those things was the program we call Spectrum. We could have done a lot of things — gone into complex architecture, scaled up [Motorola, Inc.'s chips] — we could have done anything. But the opinion was unanimous — and believe me, that isn't easy at Hewlett-Packard — that we ought to get on and make a commitment to make this thing and get everybody signed up.

Risc really has a very broad meaning in our company. To us, it's a concept we can unify behind, harmonize our entire program, rationalize the network, do relational data bases that everybody can use.

What applications do you see as best for Risc?

I think that's yet to be demonstrated. I think [HP Vice-President for Research and Development Joel Birnbaum, who heads the Risc effort] would probably argue with the premise that Risc may be good for some things and not for others. At least at first, everybody in HP's different divisions thought it was better than anything else they were looking at to solve their set of problems. It's a pretty universal approach to things.

HP has long had a policy of keeping its divisions relatively small in order to foster a sense of entrepreneurship, of individual initiative. How do you retain that sense, as you grow and try to unify the company around the Risc product strategy?

It's a tricky business. You have to put yourself in the position of the division manager. You like to have your own R&D, your own manufacturing capability, to give your product a proprietary character. It's great. But it is not great to have done that and discover that all the things you did didn't make sense because they didn't fit.

Now you can argue that we've taken something away, but I think if you talk to most HP division managers, you'd find they got something back — a very clear view of what they need to do to be successful.

Last month's Vectra announcement would seem to indicate a different thrust for HP. An IBM Personal Computer AT-compatible, by definition, must be lower priced than IBM. HP traditionally has been noted for premium quality at a premium price. Is Vectra a change?

No, that view is not usually accurate. We are premium quality, but not at a premium price. We think about all the features and are a little more rigorous, perhaps, about packaging things that are truly useful — as opposed to hanging out the lowball deal — that maybe we get that reputation. But if you look at the Laser Jet printer and other products, you see products that are very price competitive — with the HP quality. I think this product is very much in that tradition.

What's your view on the computer slump?

If you look at HP's business, the slump is an electronics slump, not just a computer slump. All of our businesses have been about equally affected. Is it at an end? I don't know. I think there is some reason to be hopeful about the next period ahead, but I'm not anticipating some rapid turnaround in which we re returning to red-hot, double-digit growth rates.

Will that type of growth ever happen again?

Of course. People are quick to say the bloom is off, [that] there's no trend-line growth. I am not personally ready to believe that strong growth opportunities for electronics are over. I really think we're seeing here the confluence of a lot of trends, including the impact of a very rapid defense buildup, the [personal computer] overkill and legitimate customer questions [about networking].

You recently completed your work as chairman of the President's Commission on Industrial Competitiveness. What is your opinion of Congress' apparent direction toward placing duties on imports?

Wild stuff. But in the lack of clear leadership policy, it's not surprising that you find people who are frustrated and pressured by their constituents. There are plenty of people in real pain, and I think you tend to get a lot of seat-of-the-pants backlash that's not good for us and not good for the world.

What are the biggest challenges facing the U.S. in world competition?

It's clear that our ability to compete has been demonstrably eroded over the last two decades, not just while the dollar has gone up.

Very simply, we don't think trade is a national priority. Everyone says, well, the rules of the General Agreement on Trade and Tariffs [Gatt] cover these things. But this is an organization that exists solely to deal with tariffs. World trade has grown by a factor of seven since 1970, but the fraction of transactions covered by Gatt has actually gone down while the incidence of nontariff barriers and other issues have gone up at a geometric rate. And we are not organized to manage that process.

For the computer industry, how do you feel about the Microelectronics and Computer Technology Corp. (MCC) research consortium as a way to boost U.S. competitiveness?

We strongly endorse the idea of public/private cooperation, particularly with the research universities, such as the Center for Integrated Systems at Stanford. Now with MCC, you've changed that from a research cooperative to joint product development.

I personally have a lot of reservations about that. It may be good for some companies, but after evaluating it at Hewlett-Packard, we have not elected to be part of that program.

I think you really lose a lot of the competitive differentiation. Our company's hallmark is engineering prowess — the ability to make that different product, advance the state of the art. We wouldn't know how to function if we had the same thing as anyone else.

What has been your experience selling HP products in Japan?

I would say our joint venture company in Japan has worked very well. We have the ability to compete quite effectively, but that doesn't mean we don't incur some biases. I found myself making a sales call a few years ago to a Japanese customer and saying, "Well, I'm here with you representing Hewlett-Packard, a local company, right?" And he said, "Well, it's not a real Japanese company."

We sell very well . . . where we have a demonstrably better product, and we have lots of trouble where we're one of the pack.

Are the recent moves by U.S. semiconductor vendors toward protectionism realistic?

Well, I think they got [Japan's] attention. That's the most you can hope for. Whether the remedies will work out OK, I don't know. The Japanese are not easy negotiators; you get movement out of them when you push them hard. Take the pending [congressional] legislation. I don't know if they'll pass it or not, but it's certainly having a very real effect.

VIEWPOINT

EDITORIAL

New Jersey and us

A million or more New Jersey automobile owners are currently frustrated by a government agency's incompetence in matters of basic automation policies and practices. If the same sort of thing had happened in a private business, resignations would have been demanded, heads would have rolled.

Governments and computers can be a bad mix for several reasons. The New Jersey case represents just one of them.

Here's what happened: Officials at the state's Department of Motor Vehicles thought they were getting a sophisticated system for tracking license and registration renewals; they thought their high-powered consulting firm, Price Waterhouse, would be able to design it; they thought Price Waterhouse was correct in using a fourth-generation language and a relational data base manager from Applied Data Research of Princeton.

They thought wrong. The system simply could not handle its daily work load. As a result, untold numbers of New Jersey drivers have been unable to register their cars or were incorrectly listed as operating unregistered vehicles and were being cited for the offense. The state hoped the system would cut $3 million per year from its operating costs; instead, it now is paying $160,000 per month in overtime to cope with a backlog of 1.4 million registration records. Price Waterhouse has agreed to pay for reprogramming, at a estimated cost of $2 million.

Now, to this point the New Jersey Department of Motor Vehicles experience is not uncommon in the private sector. System designs frequently do not work out. Happens every day. But it doesn't happen every day that such flawed systems are accepted and implemented by the client without appropriate testing, without backup systems in place and without soliciting — in this case — competitive bids from several suppliers.

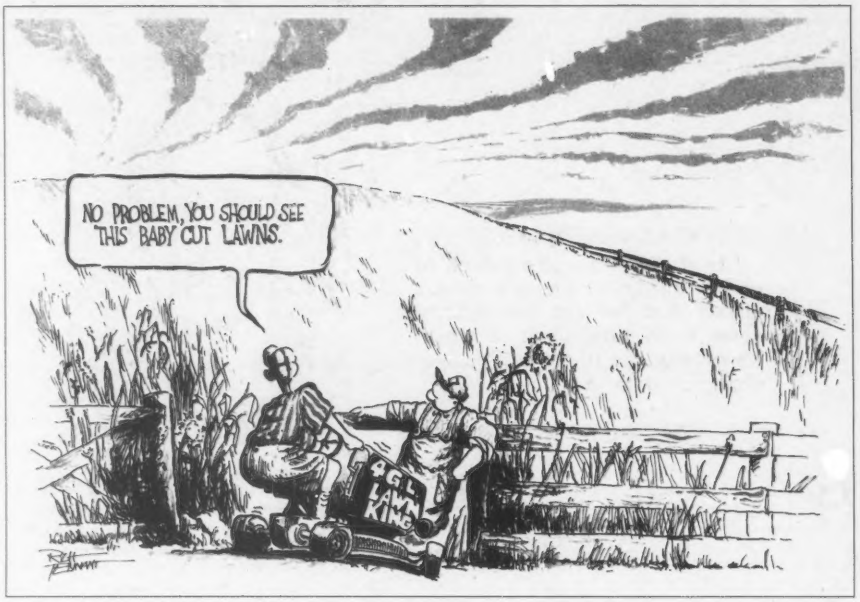
Earlier this year, the U.S. Internal Revenue Service attempted a dual hardware and software conversion. It worked, after a fashion and after delaying tax refunds considerably. Now we have the New Jersey case. In both instances, the decision was made to implement a new system seemingly without regard for the effect failure or shortcoming might have on the public.

Private sector firms that endanger the delivery of their product or jeopardize their relationship with the customer base are likely to see customers seeking out alternative sources of products and services. Not so with government agencies. Here, we are all like today's motorists in New Jersey: nowhere else to go for services, no way to hold a government agency accountable for its unconscionable treatment of the citizenry.

An investigation is under way, hearings have been scheduled, fingers will be pointed and formal public blame assessed. But none of that excuses the set of circumstances that created the situation.

Managers of government data processing operations must recognize that their systems require even more rigor in design and implementation, even more rigid adherence to professional standards than those of private firms.

With government DP operations, it is not enough that solutions be elegant, cost-effective or on the cutting edge of technology. Above all, they have to work.



LETTERS TO THE EDITOR

Million instructions per second rating claimed to be inaccurate

In the article, "Hardware Roundup" [CW, Aug. 19], the IBM 8150A and 8150B systems are both rated at 0.86 million instructions per second (Mips), the 8150B has two 0.86 Mips processors and a system rating of 1.37 Mips.

I find this error particularly interesting because the statement "It was the year of parallel processing — that is, using multiple CPUs operating concurrently to equal the performance of larger mainframe processors" is highlighted in the article.

R. Mark Ulrich
Dallas

Consultant trade organization offers credentials, lower fees

In the Update, "Choosing and using consultants" [CW, Sept. 2], you failed to mention the Association of Management Consultants, which is a consultant trade organization more than 25 years old that consists of small consultant firms.

By using the services of such consultants, many of whom specialize in the problems and solutions of the data processing profession, it affords the client the benefits of a company's continuity, generally at lesser fees than those of the larger, Big Eight consultancies.

In addition, clients generally do better when they look for credentials, especially certifications. Although by no means infallible, it does help narrow down the field of choice.

Marsha D. Lewin
Los Angeles

Senior business managers in U.S. criticized for neglecting security

The greatest unkept secret in U.S. business today is how poorly secured organizational assets are, particularly information assets. U.S. management is plainly and simply derelict in its responsibilities in that regard.

Why has management been so derelict? It is because information seems so cheap and so freely available. Computers spew millions of lines of information in a matter of seconds. Anything that can be produced so quickly and with so few errors must, therefore, be cheap, or so says the executive mind.

Look at the number of major corporations and governmental organizations that don't have documented and tested disaster recovery plans, computer access controls and proprietary information protection plans. The Data Processing Management Association conducted a recent survey of large systems user organizations that indicated less than half of the responding organizations had full- or part-time data security officers.

What to do? The only thing that has caused a mild stirring among senior managers is the recent hacker intrusion problem. Their reaction to the hackers borders on paranoia because information burglary is still mainly an insider problem. But if the hackers persist in their penetration efforts, we may finally wake management up. And none too soon, I might add.

G. J. Bologna
Adrian, Mich.

Job-hoppers' resumes may merit closer look from potential employers

In many of your past issues are references to the short-term employee, or job-hopper, whom employment agencies and personnel departments say they automatically write off. This could be a grave error. The type of person most needed by many companies in today's ever-changing environment, especially in the management and upper level staff positions, is probably in that group.

Just about every company today needs people who have experience in many different functions within data processing, who can get into a situation quickly, analyze it, produce solutions and get them implemented. Because of the tremendous changes that have occurred in the last few years in this business, it is unlikely that those people who have been with the same company for the last 10, five or even three years have the knowledge or experience in these functions.

The next time you are looking at resumes and come across a job-hopper, take a closer look at what that person has accomplished. That is the real key.

Jeff D. Vowell Jr.
Middletown, N.J.

VIEWPOINT

Artificial intelligence: myth vs. reality

WOHL STREET MINIJOURNAL
Amy Wohl

Five years ago, the buzzword for end users was "office automation." It would write a letter, find a lost file, replace and fire an incompetent secretary and brew really good coffee. Three years ago, it was Lotus Development Corp.'s 1-2-3, a spreadsheet so good it would not only figure out your business plan, but it would also guarantee that plan's success.

Today, the new buzzword is "artificial intelligence." Computers equipped with artificially intelligent features are expected to — pick one or more of the following — eliminate tedious office chores, outthink all but the brightest and most creative workers, do your work and brew really good coffee.

Common sense says this is unlikely. Computers are big, very fast adding machines. If you can find a way to express or represent something in numerical symbols, computers can process such information very rapidly. Computers are very good at handling information that can be processed sequentially and not so good at processing information that requires lots of simultaneous intuitive comparisons.

To the extent that the office processes data and needs to add it up, categorize it, sort it or find it, computers are helpful. Particularly in the area of categorizing and finding information, computers can often behave in eerie, near-human ways — such as knowing that you are interested in a particular subject and collecting information on that subject for you from strange and wonderful places — but that is simply a computer obeying your command and not human intelligence being replicated.

To the extent that the office is a special kind of social tribe, organized for the purpose of carrying out a particular goal, it is more difficult for computers to be genuinely helpful. Much of the work that goes on in offices requires social interaction and highly complex, single-time decisions — a combination of discussion, disagreement, research and its aggregation and comparison, further discussion and finally decision making and consensus. Computers can be very helpful in supporting such transactions, but they are limited in their ability to become the transactor.

It is even less likely that an expert system could browse through the memos, pick the best idea and gain a consensus for this idea from the relevant corporate decision making groups. In fact, this process sounds futuristic at best, silly or impossible at worst.

Expectations raised too soon, too high

In the future, however, such investigation and decision support systems could occur. In fact, understanding what's going on in commercially offered artificial intelligence software today is largely a problem of controlling expectations that may have been raised too soon and too high.

Note well the term *commercially offered*; there are lots of very interesting things going on in the research laboratories of universities, large computer companies and small start-up firms — but they are probably far away from delivery as stable, commercially packaged and distributed products.

Most software packages labeled "artificially intelligent" aren't. That should be a simple enough statement, but it seems to need some further details. A package that has information about how you prefer to do something and where you would like the result isn't artificially intelligent, it's just nicely programmed. In an office context, we might expect an artificially intelligent software package to do some or all of the following:

- Be an expert — draw conclusions about a new situation described to it in terms of the expert's stored knowledge, drawing on a set of rules.
- Learn — react to new situations based on learning new behavior. Rules for this new behavior would be based on a combination of stored knowledge, stored rules and modifications of these rules based on observation and inference. Such systems are called heuristic.
- Understand natural language — decipher the meaning of natural (unstructured) and colloquial language and interpret the precise meaning to a computer.

Very few software packages for end users do these things; if they do, their scope of operation is deliberately limited to permit them to function within the confines of relatively small, slow machines. Also, another element enters the picture: Many of the current packages are decision support systems that require the input of significant quantities of information and the assignment of weights or values; when that information is available, the system can help the user "see" the relative value of different decisions via graphics. However, most of us don't make, or want to make, business decisions that way.

More intuitive, less structured programs

To be responsive to user expectations, artificially intelligent programs will need to be more intuitive and less structured in their approach, and it is that intuitiveness that is so hard to capture.

It is these user expectations that make the near-term market for artificially intelligent software so turbulent. It is unlikely that any package could live up to current expectations. And to rise above the noise level, software vendors are using louder and louder — and less and less accurate — words to describe their new offerings.

However, artificial intelligence is slowly being embodied in all kinds of computer software. Eventually it will not only allow users to share the scarce and valuable expertise of specialists but also help create systems that are very simple to use and highly custom-tailored to individual needs.

In the meantime, common sense is still a valuable commodity. Artificial intelligence is no more a panacea than office automation was. Both are useful tools. It is foolish to expect a $695 software package and a $3,000 computer to replace the work experience of a thinking human being. But they surely can help that person do a better and bigger job.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of the "The Wohl Report on End-User Computing" newsletter.

Developing new corporate muscle

MANAGEMENT MATRIX
Walter F. Cuirle

Let's suppose that you are with a manufacturing firm that is about to begin development on a new product or with a financial concern about to venture into a new market. First, top management must make policy — that is, set some sort of direction for the company.

Next, department managers have to come up with some way to get the job done. In other words, they have to define a set of procedures. If policies define what and why, then procedures define how and by whom.

Just as exercising a muscle starts growth, new corporate policies are a deliberate attempt to build strength in a new area, and the exercise spawns new procedures. One difference is that the growth of corporate muscle isn't always as well controlled as you might like it to be. One similarity is that both processes hurt.

Controlling growth and the network that supports it is something that corporations do not accomplish as well as muscles. The natural growth of procedures seems to be linear: When a new situation arises, a new step is tacked on to an existing procedure. As growth continues, what used to be a comprehensible and straightforward process becomes a burden.

One huge procedure, intended to handle any eventually, might address many corporate actions but it fits only the largest well. In most applications, it will move slowly and carry a lot of waste. It can inhibit growth rather than nourish it. Is there any way to slow down or prevent the process?

'One size fits none'

Instead of allowing a "one size fits none" behemoth of a procedure to develop, set up a variety of procedures in a branching structure. These simplified methods are tailored to a particular class of activity or type of problem.

Each is a branch off the larger concept, but none is any larger than it has to be to get the job done. Now suppose that a user wants a truly simple modification to a report, something like the transposition of two lines or the substitution of one figure for another when both are on file. Should this user have to go through your entire procedure? Certainly not. The user could probably handle it all in one meeting and a short one at that.

The advantage of having branched procedures is clear: Everybody gets what they want with a minimum of wasted time and paperwork. Users are happy because the groundwork seems to be both reasonable and no more than necessary. Your staff is happy because it is spending less time in meetings and more time on the job. You are happy because the result is lower overhead and quicker turnaround.

The disadvantages are the necessary complexity of such a system. Single-procedure methods are honored more in the breach than in the observance and are — let's face it — most useful in shifting blame and papering over mistakes than in getting a job done. Branched procedures are simple in application but complex in structure and require careful advance planning.

Obvious political disadvantages

There are some obvious political disadvantages too. If some users get their requests processed more quickly than others, even though the difference is on strictly technical grounds, they will want to know why.

It won't be possible to pass the buck to an anonymous book on the shelf anymore and say, "We're doing it this way because the book says that's the way it's done." Somebody is going to have to explain to the user what procedure to use and why and to make it stick. That somebody is you or a designated project leader from your group.

On second thought, maybe these aren't disadvantages after all. They are just the side effects of going from a sluggish pipeline to an intelligent network.

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

Five-phase upgrade untangles bank's spaghetti code

By Donna Raimondi

JACKSONVILLE, Fla. — A vintage 1960 credit card software package that had deteriorated into dead and scrambled code has had new life breathed into it at Florida's seventh largest bank. What's more, the rejuvenation has allowed the bank, with $3.8 billion in assets, to adopt products and services that it could not previously support.

The 88-program, 150,000-line banking package had become so difficult to use that only senior programmers could touch it, even to make minor changes. "We were always able to put [in] what the user wanted," said Frank Hobby, vice-president in charge of systems development at Atlantic National Bank of Florida. "It took a lot of hard coding and special codes and programs to get the stuff [the users] wanted done."

The bank had two ways to go if it wanted to be able to modernize its operations and provide its users with continued services. It could either buy a package, which would cost at least $300,000, or it could rewrite from scratch, which would take at least three years. It made the decision to rewrite and had just started that task when Hobby heard about restructuring spaghetti code.

Peat, Marwick, Mitchell & Co. of New York ran tests on the credit card software that showed it to have dead code and runaway logic. Dead code is code that is useless but was never removed from the system because nobody had time to do it. Runaway logic would have "blown off" the system had anyone gotten into it, Hobby said.

Programmers and users were frustrated at the length of time it took to get anything new from the system, Hobby said. Users would come to MIS and say they needed something right away, and the programmers could not produce it in the required time because of the complexity involved in making any kind of change. "Our run documentation book was about two feet thick trying to figure where everything went," he added.

After Peat Marwick determined what the problems were, it performed a five-phase upgrade, Hobby said. The total cost to the bank was $160,000.

The company first did a structured retrofit process that turned the bank's spaghetti code into structured Cobol. The second phase of the rejuvenation process was to analyze data information and come up with a master library so that each program would no longer have to maintain its own library.

A validation run after the first two steps matched the renovated system's output with a parallel run to turn up any discrepancies. "After the retrofit, everything was fine. There were no discrepancies at all," Hobby said.

The fourth step was to document the system as it stood after the retrofit. "We are still not to the ultimate goal," Hobby explained. The structured format will now allow the bank's staff to change the credit card system to match the user's needs and to expand in the future.

Preparing a design statement

The last phase of the project that involved Peat Marwick was to prepare a design statement for the evolving system. The company met with the bank's MIS department to help them change the old sequential processing method into Vsam files. They also met with users to determine what types of reports would help them improve productivity.

The bank is now involved in changing the whole system again, Hobby said. What Peat Marwick did was give the bank a starting point, he added. "We can now use probably 70% of the existing [system of] programs because it is structured and it is in a nice hierarchy so we know where everything is. . . . Before, the way it was so fragmented, we would almost have to rewrite everything."

Benefits to the bank include the ability to offer new or better products to its customers, Hobby said. A customer who changes branches, for instance, does not have to wait for a new card to be issued. Customer histories can be moved to new services automatically. If a customer is late with a payment, his history now shows whether he has been with the bank for one month or 10 years, a fact that has bearing on how the bank reacts to late payments.

The bank will now be able to go out to a branch that does not have a credit card system and start processing for the branch — a practice called correspondent banking. Bank users will be able to get more on-line reports and faster changes to the kind of reports they request.

Accounts that are tied to the prime rate can have their variable interest rates changed quickly, Hobby said. A bank control file is being created to allow users to change quickly interest rates or account due dates.

"After we make these changes to the system, it will be another five to 10 years before we have to look at it again," Hobby said. The 24 programmers in his National Advanced Systems Corp. 9050 shop worked with Peat Marwick throughout the process so that they need no retraining. Senior programmers are now able to concentrate on development work, leaving the coding to the junior staff.

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AT&T reaches out

Tools permit limited file exchange between 3B line and IBM mainframes

By Paul Korzeniowski
CW Staff

LINCROFT, N.J. — AT&T last week announced its first set of tools that enables an AT&T 3B computer to communicate with an IBM mainframe.

Included in a deluge of AT&T product announcements were two models of the 3B, four communications products for the 3B line and a version of AT&T's Unix System V Release 2 that runs

IBM gives up SBS for 16% of MCI

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — IBM last week initiated a major push into telecommunications by selling its 60% ownership interest in Satellite Business Systems to MCI Communications Corp. in return for an immediate 16% stake in MCI, the second largest long-distance carrier. The agreement permits IBM to acquire up to 30% of MCI during the next three years, and IBM indicated it will in-

Crystal ball
Profile

standards/53

ernment are typically motivated by personal financial crises or job dissatisfaction. Page 2.

Following the murder of two Wang employees in El Salvador, some companies are reassessing aspects of international business travel. Page 4.

...ternational unwrapped a ...Initial

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — Amdahl Corp. last week extended its supercomputer line both upward and downward by announcing two additional vector processors, one with performance exceeding one billion floating point operations per second.

With the introduction of Models 1400 ... Amdahl's family of IBM-com... built by Ja...

and roughly 40% the performance o... Cray Research, Inc.'s X/MP-1.

The top-of-the-line 1400, meanwhil... reportedly executes 1.14 Gflops, cor... pared with 533 Mflops for the 9-mont... old 1200, and outperforms t... X/MP-1 by approximately 400%.

Each of the four Amdahl machi... runs the same software and can be ... graded in the field to its next larger si... system, according to the company.

Although the four machines h... nearly identical machine cycle times ... the 1400 produces eight ... with

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- **65.** Public Utility/Communications Systems/Transportation
- **70.** Mining/Construction/Petroleum/Refining
- **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
- **85.** Computer Service Bureau/Software/Planning/Consulting
- **90.** Computer/Peripheral Dealer/Distributor/Retailer
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Types of equipment with which you are personally involved either as a user, vendor or consultant.
- **A.** Mainframes/Superminis
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Financial firms making move to packet-switching nets

Cite better control, increased savings

By Paul Korzeniowski

Financial service companies are trading in private leased-line networks for packet-switching offerings in an effort to monitor costs and save money.

Packet-switching networks, often called value-added networks, run on lines a vendor leases from telephone companies. The networks supply users with management and control functions such as protocol conversion, error detection and high reliability.

During the past few years, Dun & Bradstreet Corp., located in New York, has acquired a number of businesses so that it now consists of 30 different companies. With the additions came a growing number of networks. Dun & Bradstreet was left with a hodgepodge of incompatible private asynchronous, bisynchronous and Systems Network Architecture networks, according to Allan Conner, vice-president and general manager of Dunsnet, a division of the company.

Rather than supporting the different networks, the company decided to search for a central network. "Dun & Bradstreet is in the information business," Conner noted. "We wanted one network that could support all our services."

Critical selection factors

Critical to the selection of a network was its ability to support asynchronous and synchronous protocols simultaneously. Another consideration was that network management functions be provided by the vendor. When the evaluations were completed, the company chose to install a packet-switching network from GTE Telenet Communications Corp. in Vienna, Va.

Thus far, Dun & Bradstreet has moved half of its old networks onto the packet backbone. Packet-switching services are provided between 156 private nodes throughout the U.S., and the company plans to expand service to 250 nodes by next year, according to Conner.

Because installing the network was a new experience for the company, there have been a few hitches. "Network management is a tough business, and our concept of how it worked was quickly shot out of the water," Conner noted. Initial projections of the time needed to test and debug a network turned out to be inaccurate; deadlines approached, and Conner experienced some anxious moments.

> *'Network management is a tough business, and our concept of how it worked was quickly shot out of the water.'*
>
> — Allan Conner, Dunsnet

Conner estimated that the $25 million packet network currently costs a little more to operate than the multiple old networks. "We expect to start saving money when all our business has been transferred to the packet network," the vice-president noted.

A second company attempting to save money by switching to a packet backbone network is MCorp., based in Dallas. The company, which processes data for banks, has been using a private-line network to connect 8,000 users. A proposed packet-switching backbone network will provide financial information to 900 banks and their branches, drive up to 1,000 automatic teller machines and support up to 10,000 point-of-sale terminals, according to Paul Bell, a consultant who is managing implementation of the network.

When the corporation looked to upgrade its network, Bell claimed that only a packet-switching network met the firm's communications needs. The company evaluated a private-line network but found it unacceptable because it would work well only with IBM equipment, according to Bell, who works for New York-based 23K Group, Inc. Since MCorp. required support for other equipment, a packet-switching network was chosen.

Rather than having a vendor manage the network, the company plans to handle that task itself and is installing equipment from Amnet, Inc., based in Watertown, Mass.

When completed, the network will have 18 nodes located in southwestern parts of the U.S. such as Texas, New Mexico and Oklahoma. The first two nodes were installed in July, and nodes will be added at a rate of two a month until they are all installed. Bell estimated that the network, which will cost between $3 million and $5 million, will pay for itself in two and a half years.

Microcomputer use forced Irving Trust Co. in New York to supplement its private-line networks with a packet offering. "Two years ago, the company had no microcomputers; today there are 190 in use," noted Ken Soldwedel, vice-president of the treasury services department at Irving.

One reason for the increase in microcomputer use was that Irving Trust's customers began working with microcomputers. Those customers wanted to call the company and obtain financial data but often were unable to do so. Irving's leased-line networks supported a bisynchronous protocol but did not work with the asynchronous protocol used by most microcomputer communications packages. A packet network helped to overcome this problem, according to Soldwedel.

Another reason for the selection was that the company's foreign customers could work with a packet-switching network but would be unable to use a leased-line network.

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Automated ID system crucial in finding 'Night Stalker'

Pressed into service, Cal-ID matched prints

By Jeffry Beeler

SACRAMENTO, Calif. — State law enforcement authorities never expected their first automated fingerprint identification system to go into operation until mid-October at the very earliest. But after receiving an emergency request to assist in the notorious "Night Stalker" murder investigation, the officials briefly halted the system's installation and gave Cal-ID an unexpectedly early workout that demonstrated its fitness under realistic conditions.

The system was still in its early implementation stages when state Attorney General John Van De Kamp asked whether it was sufficiently functional to identify a latent fingerprint thought to belong to the sought-after Night Stalker.

Van De Kamp's Aug. 29 inquiry prompted Cal-ID's supplier — Boxboro, Mass.-based NEC Information Systems, Inc. — to interrupt its ongoing installation and load the system with its operating software two months ahead of schedule.

After testing the software to ensure its soundness, operators used an optical laser scanner to compare the fingerprints with the 750,000 other prints already in the system.

Within just three minutes, the system responded with 10 possible matches, which it listed in their order of probability. Heading the suspect list was an identification number corresponding to 25-year-old Richard Ramirez, a petty offender with no previous record of violent crime. Late last month, Ramirez was formally indicted on several charges relating to the murders and assaults.

On Aug. 30, forensic experts confirmed Cal-ID's identification and paved the way for law enforcement authorities to make public Ramirez's name and photograph. Two days later in East Los Angeles, police arrested Ramirez as the chief suspect in a string of brutal slayings that began last February and claimed at least 14 lives. The killer earned his "Night Stalker" nickname from his habit of entering his victims' homes after dark and shooting, stabbing or clubbing them to death as they slept.

If law enforcement authorities had lacked access to Cal-ID, the state would have had to compare its own fingerprint records to Ramirez's suspected print by hand. At best, such a procedure would have taken a year and probably would have proven impossible, according to Tony Doonan, a California Department of Justice manager who is overseeing the automated system's installation.

But even with all the state's vaunted new technology, Ramirez would probably still be at large had NEC Information Systems and law enforcement officials not gone to unusual lengths to press the fingerprint identification system into premature service. Since March, the state has been converting the data in its existing fingerprint files and entering the material into the system's hardware.

To expedite the process, installers intentionally delayed the loading of the system's operating software, which permits fingerprints to be electronically compared and matched. "The presence of that software would have greatly slowed down the data entry process," according to Elton Johnson, a NEC Information Systems regional manager.

So when Van De Kamp appealed to the system's caretakers for help in identifying the suspected Night Stalker's print, they suddenly had to scramble to get the operating software up and running, Doonan said.

A stroke of good fortune

Ramirez's capture was also due in large measure to a stroke of good fortune. Because of his date of birth, the suspect's fingerprint records happened to be included in the first batch of existing files that the state chose to be converted to its new automated identification system.

Until earlier this year, California maintained its fingerprint records entirely on cards and identified unknown prints by comparing them manually against the data in its five-million-item catalog. Because of the collection's sheer volume, the state plans to transfer its paper records to the automated system in four stages, the first of which is already complete.

The initial phase involved some 750,000 fingerprint records and covered only those California lawbreakers who were born during or after 1960. The second group of cards, which correspond to offenders born between 1950 and 1959, will be completely converted to the automated system by the end of next month, Johnson said.

If Ramirez, who was born in February 1960, had been born only two months earlier, he would likely still be a free man because his fingerprint files would have yet to find their way into the new system.

As the number of fingerprints in the state's automated data base swells, the system's hardware configuration will do the same. From its current cluster of four specially designed NEC Information Systems processors, the system will expand to 18 CPUs by early 1987, Johnson said.

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Coke cans employee planning to wed Pepsi accountant

By John Desmond

NORTHAMPTON, Mass. — The battle between Coca-Cola Bottling Co. and Pepsi Cola, Inc. for the loyalty of the nation's soft drinkers has bubbled down to the world of ones and zeros. The DP manager for a Coca-Cola Bottling franchise was allegedly fired because her fiance works for archrival Pepsi.

Amanda Blake, 28, filed suit against her former employer July 15 in Hampshire Superior Court charging that her dismissal was an invasion of privacy and a wrongful termination. Blake contended in a recent interview that the same week Coke announced its original change in formula, Coke's management gave her an ultimatum: either break her engagement or have her fiance quit Pepsi.

The two decided there is more pleasure in loving than in being loved by Coke's management. Blake's fiance, Pepsi accountant David Cronin of the Pepsi Cola Bottling Co. of Windsor, Conn., declined to leave Pepsi, and the two refused to break their engagement. Blake was fired by Coke, effective April 26. Cronin said his employer had no problem with his future wife working for Coke.

'They didn't trust me'

In seven years at Coke, Blake held positions as a keypuncher, operator, programmer, programmer/analyst, assistant DP manager and finally, DP manager of a seven-person IBM System/38 shop. "It made me sad they didn't trust me," she said of her superiors. She is seeking $600,000 in damages.

Attorney Neil Jacobs of Boston's Hale and Dorr said Coke offered Blake a less sensitive job, but she refused.

Blake now works as a computer programmer at Mount Holyoke College in South Hadley, Mass. The two plan to be married soon. Neither would divulge their true preference in soft drinks, but Cronin said he usually prefers a Budweiser.

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IEEE irked at DOD data restriction

By Bryan Wilkins

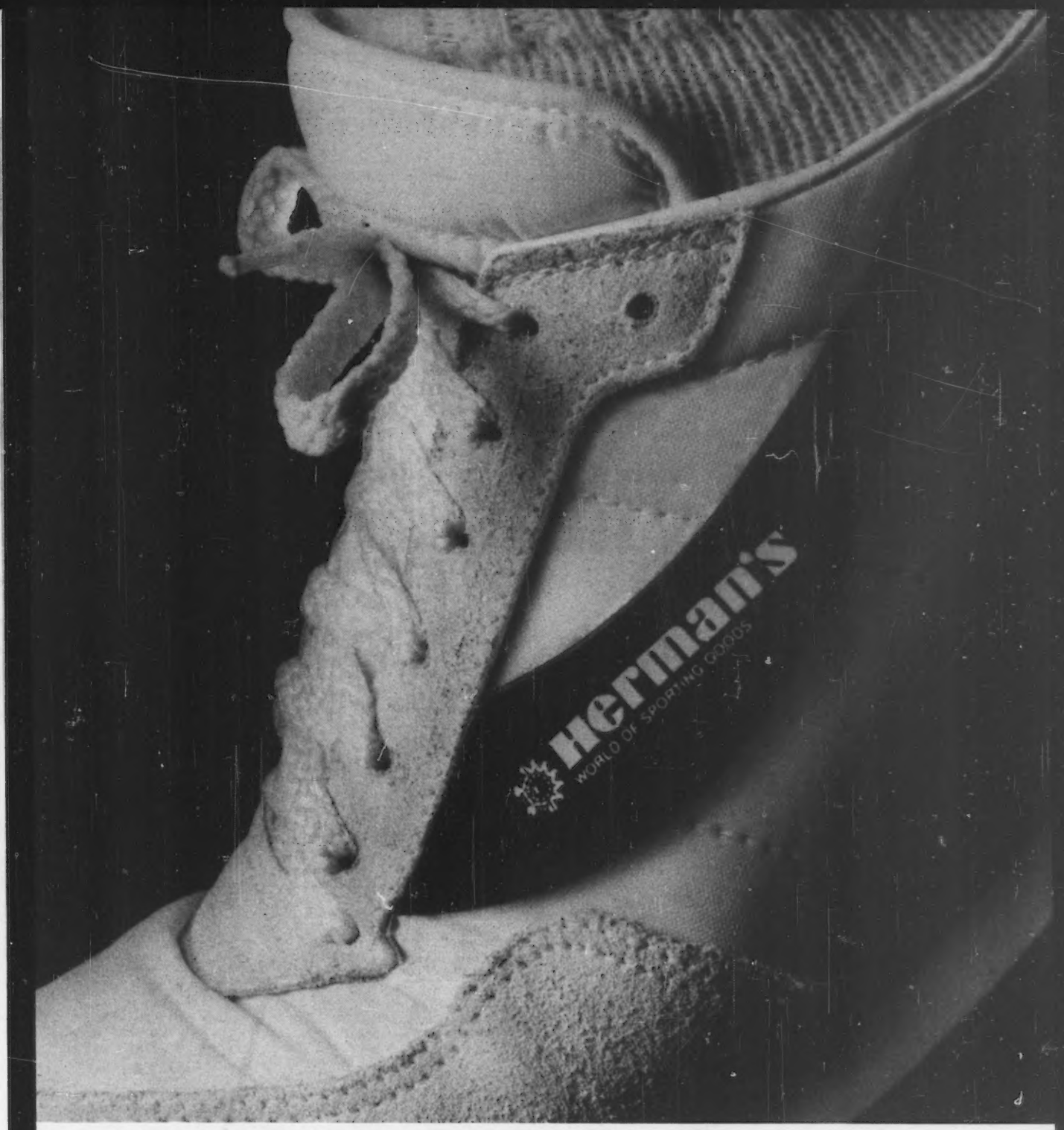
WASHINGTON, D.C. — The Institute of Electrical and Electronics Engineers, Inc. (IEEE) recently fired off a sharp letter to U.S. Department of Defense Secretary Caspar Weinberger complaining about the department's efforts to restrict the flow of unclassified information.

The IEEE said it will not sponsor nor be responsible for closed or restricted-access technical sessions at meetings held under their auspices, asserting that such responsibility lies with the government. The DOD has recently embarked on a drive to deny easy access by Soviet and Eastern bloc countries to high-technology research contained in papers, seminars and other forums.

"The open exchange of information ensures that critical peer review is applied to new advances, provides valuable cross-fertilization of ideas and helps avoid duplication of effort," the IEEE's letter said. It said DOD efforts "have resulted in the disruption of technical conferences ... and have forced the introduction of a new category of technical session, one that is unclassified but with limited access."

The IEEE said that a broad range of technical information is being affected by the DOD policies, which it charged will have "counterproductive consequences" and be "detrimental to the national security interests of the nation."

IEEE President Charles Eldon asked Weinberger to intervene personally in the institute's dispute with lower level defense officials to minimize the amount of unclassified information that the DOD wants to put under restricted access.



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Cocaine crippling growing numbers of DP/MIS pros

Abuse costing firms in lost productivity

By John Desmond
and Kathleen Sullivan

Getting up from his terminal, a 36-year-old Cobol systems analyst walked to the men's room. After locking the door of the stall, he reached into his shirt pocket and pulled out a small envelope. Inserting a short straw into the fine white powder inside, he inhaled, drawing cocaine into each nostril. Then he returned to work.

The Cobol analyst, who did not want his name published, works for a New York-based DP consulting firm that numbers among its clients many Fortune 500 companies. He began snorting cocaine on the job three years ago, when his firm sent him on a consulting assignment for a textile manufacturing firm in South America. His cocaine consumption increased after he returned to the U.S. "I began using more and more cocaine, spending more and more money," he recalled. "I began worrying that I was risking my job, because I had called in sick many times. There's only so much cocaine you can do before it has consequences."

While public attention has been focused on the popularity of cocaine among professional athletes and entertainers, use of the white powder derived from South American coca leaves has extended to the executive offices of U.S. business — and to the DP shop.

Medical specialists interviewed by *Computerworld* said they have treated a number of DP and high-technology professionals for cocaine abuse. "We've seen a significant number of people who have cocaine and other substance abuse problems who work in some aspect of data processing," said Dr. Arnold Washton, director of addiction research and treatment at Regent Hospital in New York and cofounder of the national Cocaine Hotline.

Drug counselors and medical specialists say cocaine abuse may be costing U.S. business billions of dollars a year, but the drug's impact is difficult to measure. "We've seen people make bad business decisions in the DP industry, including people who've been working on complex and elaborate systems," Washton said. "The industry has attracted many so-called baby boomers looking to be upwardly mobile. And you have a lot of young, hard-driving, aggressive business executives making significant incomes. That is the profile of the typical cocaine abuser" (see story page 29).

A systems analyst at an East Coast financial firm who headed up the company's hardware migration project was becoming a cocaine addict. As a result, the project was grinding to a halt. His managers estimated the company lost $200,000 for every week the project was delayed. After the analyst admitted to management that he had a cocaine problem, he entered a treatment program and eventually turned his performance around.

Dr. Kathleen O'Connell, a psychiatrist based in Capitola, Calif., has treated nearly 500 high-tech workers for cocaine abuse; 15% of them were executives from Silicon Valley, and 25% worked in some aspect of quality control. The pressure of deadlines and long workweeks can make cocaine use attractive for many high-tech workers, she said. "Cocaine gives them the illusion they're being more productive and sharper," she said. "Maybe in the beginning they are, but very soon productivity decreases, and they still think they're doing OK."

MITCHELL J. HAYES

Cocaine use is increasing in the industry, in O'Connell's view. "The supply and purity of cocaine is increasing, and the price is going down. We haven't hit the crest of the wave," she said.

The Cocaine Hotline receives up to 1,200 calls a day and has had 1.2 million calls since opening up May 2, 1983, Washton said.

A cocaine addict who was part owner of a micro software firm in the Silicon Valley told *Computerworld* that getting cocaine was no problem. In his company, 20% to 30% of all employees were using cocaine, and he estimated that the norm among Silicon Valley firms is more like 40%.

In the year before he sought help, a 31-year-old DP consultant in New York was smoking, snorting and shooting cocaine. He was spending hundreds a day on his habit. "When I first started using cocaine, I thought I was doing well," he said. "But to do programming you need to pay attention to detail. You have to be meticulous. Cocaine jumbles your thoughts. It juxtaposes different thoughts in your mind really quickly."

While cocaine abuse has the potential to become a major problem in the

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DP shop, managers may not know how to recognize abusers. Most managers are surprised when they learn an employee has a problem with cocaine, according to several cocaine users interviewed.

DP managers called at random by *Computerworld* were surprised to get inquiries about cocaine use by their staffs. A DP manager at a Philadelphia insurance company reported that "alcohol and coffee abuse are the main problems" he sees, not cocaine abuse. He added, "I don't know how I would know. It's not the kind of thing they send you to class on."

Cocaine use increased dramatically from 1972 to 1982, according to the Washington, D.C.-based National Institute on Drug and Alcohol Abuse, which conducts a detailed alcohol and drug use survey every 10 years.

The survey showed that the use of cocaine by 18 to 25 year olds tripled in that 10-year period, with 28.3% of the age group reporting in 1982 they used the drug within 12 months. Cocaine use by those age 26 and above more than quintupled during that period, according to the survey. The institute estimates that 22 million people in the U.S. have tried cocaine, and 5 million to 10 million use it once a month.

> *A DP manager reported that alcohol and coffee abuse are the main problems he sees, not cocaine abuse.*

An occasional cocaine user who works in computer operations at a mid-size eastern firm has been using cocaine recreationally an average of once a week for eight years. "I don't do it a lot because it's expensive," the user said. While he is usually not high at work, when he is, the user said, he gets his job done a little faster. "If you can control use, you can use it. If you can't control it, don't use it," he advised.

Further evidence of the spread of cocaine abuse in the high-technology sector is provided by the implementation last year of a pre-employment drug screening by the biggest high-tech firm of them all — IBM. The company instituted the testing policy domestically in the fourth quarter last year, as part of what a spokesman called IBM's effort to ensure the health and safety of its employees. Applicants for all positions are tested by an independent laboratory for a range of illegal or controlled substances.

While most users take cocaine on a casual, or recreational, basis, some professionals deny there can be a casual use. "Occasional cocaine use is nothing short of playing Russian roulette," Washton said. "The majority of coke users use it in a way that has not yet caused them severe medical or psychiatric problems. That's not the same as saying that occasional cocaine use is harmless. After a long period of associating taking cocaine with feeling better, a person is likely to resort to escalating use of cocaine to get stress relief. It can escalate to a pattern of destructive dependency."

Cocaine use is resulting in a loss of productivity, O'Connell said. "People who work 80 hours per week only produce about 25 hours worth of work," she said. "They're snorting cocaine and thinking they're doing great when they are doing terribly. Cocaine affects their perception and judgment."

He overslept, was useless at work and was high most of his waking hours. It was a typical day for the cocaine-addicted vice-president and part owner of a micro software company in the Silicon Valley. At the height of his habit, he was using $1,000 worth of cocaine in a week. "I was doing it at work, everywhere. My life revolved around cocaine," he said. After his company was sold and he was facing charges for distribution of cocaine, the executive finally bottomed out. "Cocaine really psychologically dominates. You quit caring about little basic things like food and sex."

■

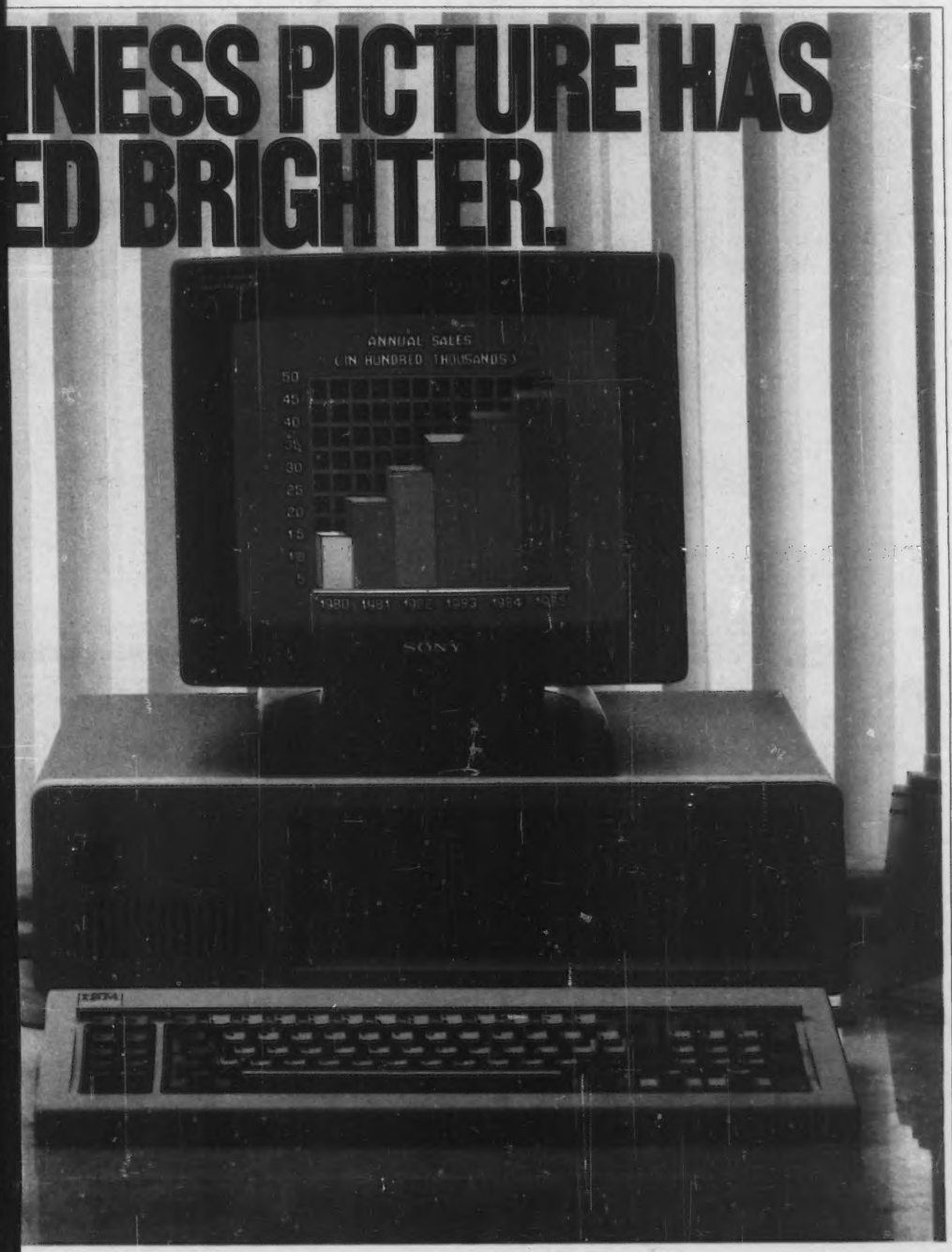
Warning signals of cocaine abuse

If you're a manager, you may have an employee with a cocaine problem and not realize it.

Identifying a cocaine user by sight is not easy, which is one reason the drug is so attractive, said Ronald K. Siegel, psychopharmacologist with the University of California at Los Angeles School of Medicine. "The effects are subtle. It's not always possible to tell. The fact they have coke in their system won't read out in gross behavior patterns," he said.

Angela Browne, research and education director of Cokenders, a Berkeley, Calif.-based treatment center, said, "The problem is really hard to spot because there is a lot of denial among cocaine users. For the employer, that presents a difficult situation. It's difficult to act on a suspicion without a full knowledge of what is going on. There is an aura

Continued on page 32



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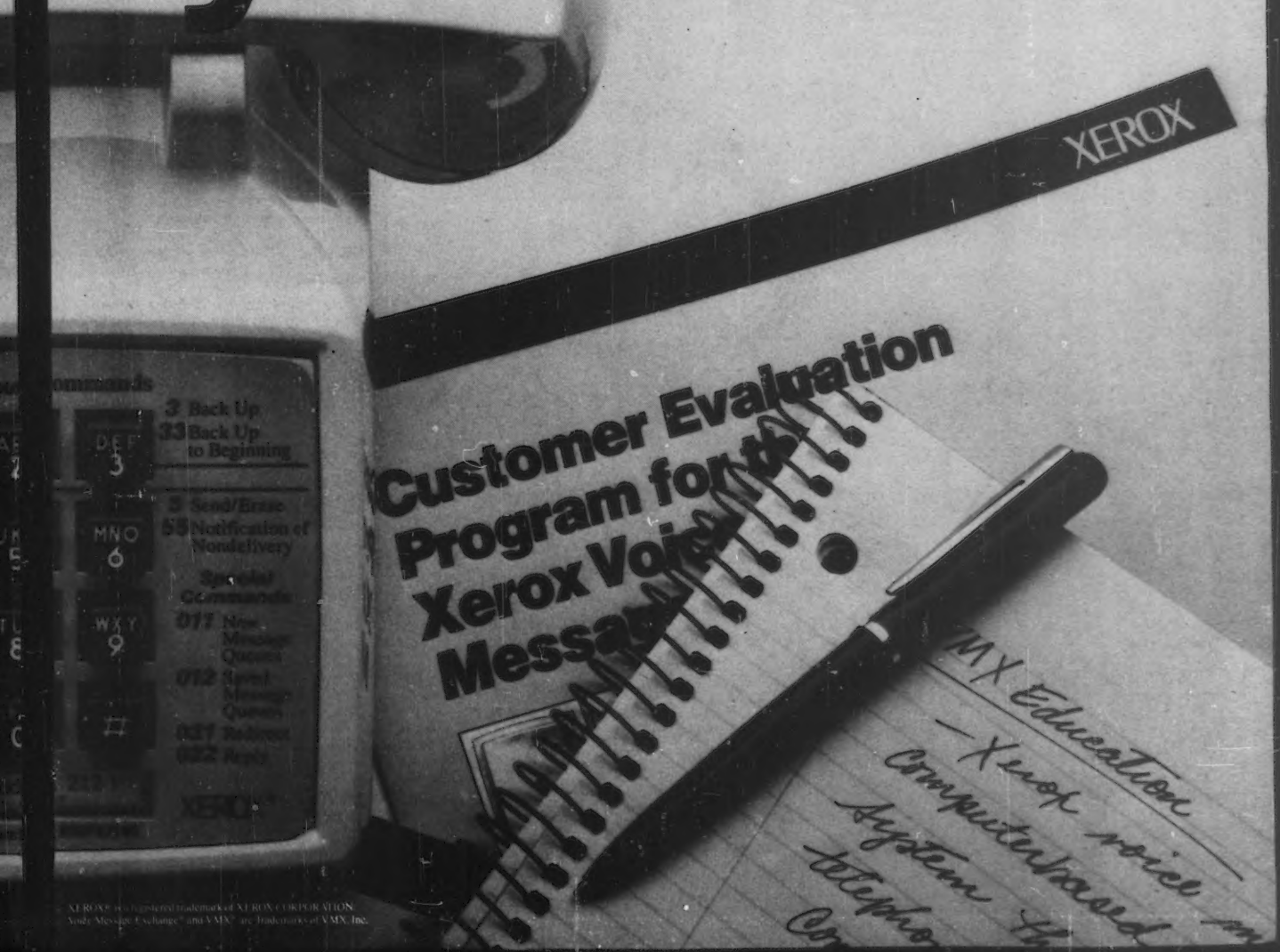

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TOKYO — Hitachi Ltd. announced that it would start taking orders in late September for a new, low-priced supercomputer, the Hitac S-810 Model 5, which it claims has a vector calculation speed of 160 million times per second. Delivery will start in the first quarter of 1986.

The machine apparently was intended to catch the eye of user firms that had avoided two previous S-810 supercomputers for price reasons. The Model 5's standard rental cost is $167,000. The supercomputer has a memory of up to 128M bytes and is said to be the first to offer 31-bit addressing. The vendor, which so far had clinched six orders for the earlier 810 models, said it expects to sell approximately 50 Model 5's in the first five years.

MILAN, Italy — Altos Computer Systems, Inc. of San Jose, Calif., announced the launching of its affiliate in Italy during a news conference recently. Luciano Luini was named its Director General. Altos, maker of multiuser micro systems using the Microsoft Corp. Xenix and AT&T Unix operating systems, has products available in 55 countries with more than 70,000 installed systems worldwide. According to the U.S. marketing research company Dataquest, Inc., sales of multiuser micro systems costing between $6,000 and $25,000 will reach 510,000 during 1985 with nearly one fifth of those sales coming from Europe.

BEIJING, China — A breakthrough in Chinese language processing research has been made by Beijing Teachers University with the introduction of a computerized language information storage system. The system was designed to help check written character frequency, to edit dictionaries and to research the language. The software consists of three sub-data bases of Chinese characters, phrase and language information, a Chinese word index file and enquiry operating code. According to International Data Corp.'s "EDP China Report," the system has been assessed and approved by a team of 60 linguists and computer specialists.

LONDON — Apricot, Inc. shares fell dramatically in September following an announcement that profits for the first half of the year would be considerably lower than expected. Apricot, the former Applied Computer Techniques, is the largest British microcomputer manufacturer but has been hit by the slow start of its new operations in France and Germany. The company's problems have been compounded by late shipments of its new models.

BRASILIA — The Brazilian government has decided to oppose the U.S. government's effort to persuade Brazil to drop its restrictions on the importation of foreign computer equipment and software.

President Reagan recently announced the start of an investigation into Brazil's trade restrictions in preparation for what some say may be a retaliatory response. In reaction, Brazil's Minister of Technology Renato Archer vowed that the trade restriction will not be lifted. "Informatics," he said, "is not a simple industry. It must have tools to protect it, even if we have to pay a high price for it."

Brazil's market generated $1.7 billion last year, half of it shared by 200 Brazilian firms.

THE HAGUE — Although computer vendors sometimes offer personal computers and mainframes free of charge to universities and research institutes, giving away robots with favorable leasing rates is less common. The Dutch subsidiary of Swedish robot giant Asea AB will install robots at 22 high schools for technical education in the Netherlands, officials announced recently. The schools will lease the robots for approximately half the normal leasing rate, according to a company spokesman.

STOCKHOLM — Fewer than 10,000 personal computers are installed in the 1,000 largest companies in Sweden, according to an as-yet-unpublished report by International Data Corp.'s Swedish office. The report added, however, that the largest companies will have more personal computers than terminals within five years.

From page 29

Cocaine abuse warning signals

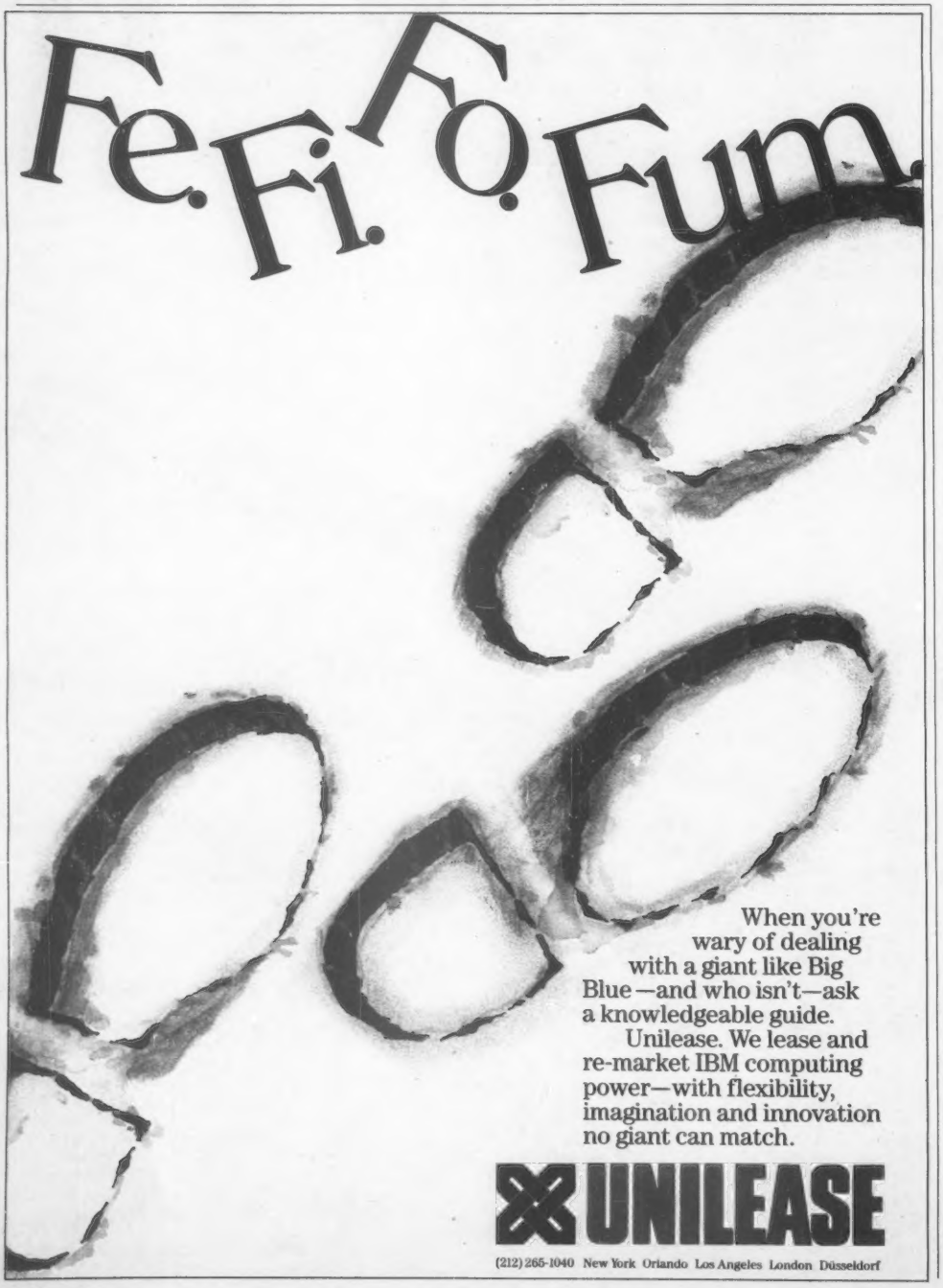
of deception. The people using cocaine fool themselves and others."

The medical professionals offered the following cocaine abuse warning signs:

- ✔ Changes in behavior such as tardiness, absenteeism and mood swings.
- ✔ Changes in personality, such as a tendency to become withdrawn or unusual displays of irresponsibility or dishonesty.
- ✔ Changes in personal appearance, such as dirty fingernails, weight loss or weight gain.
- ✔ Physical signs, such as runny nose, sniffing, rubbing sinuses, dilated pupils, more gruffy voice, dazed or overly alert look in the eyes.

A national cocaine abuse hotline, 1-800-COCAINE, provides information and counseling referrals.

— Kathleen Sullivan and John Desmond



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The new 1-2-3 worksheet has been expanded to 8192 rows—4 times the original size. It's now more flexible because advanced memory management allocates memory more efficiently and allows data to be stored anywhere on the worksheet. Larger applications can be developed because 1-2-3 Release 2 addresses memory above 640K when used with new expanded memory boards which support the Lotus/Intel®/Microsoft® Expanded Memory Specification.

New 1-2-3 is designed to support the Intel 8087/80287 math coprocessors so users can perform many calculations faster. And it incorporates a wide range of added functionality from string functions and string arithmetic to easier range and error handling.

1-2-3 Release 2 has 40 advanced macro commands, so it's easier to develop customized applications from the simplest to the most complex.

And users can run new 1-2-3 directly off a hard disk without using a key disk.

It makes a good corporate fit.

If your company is already using Lotus products, new 1-2-3 makes an easy transition. There's no need to retrain current users. And now 1-2-3 comes with a learning guide to help new users get up and running quickly and easily.

1-2-3 Release 2 is designed to work with the entire family of Lotus products—1-2-3 Release 1A, Symphony® and Jazz.™ So files can be exchanged, and information processed among all your Lotus software users.

And upgrading is painless for you and your company.

Lotus is offering a 1-2-3 Upgrade program to all registered users. For $150, registered users can purchase a special Upgrade product. Copies of 1-2-3 Release 1A purchased on or after April 24, 1985 can be upgraded for free.

Individual users can register by returning their 1-2-3 Warranty Registration Card to Lotus or by calling 1-800-TRADEUP.* Upgrade instructions will then be forwarded by Lotus.

Companies who want to order more than 100 copies of the upgrade product should contact their local Lotus sales office or call 617-253-9186.

For everyone who upgrades, there's also a $40 rebate offer on Intel's Above™ Board, the first expanded memory board certified by Lotus.

We think you'll find new 1-2-3 the best thing since, well, 1-2-3.

*In Canada call 1-800-447-4700.

Suggested retail price of 1-2-3 Release 2 is $495. 1-2-3 Release 2 requires 256K RAM. Minimum requirement for 1-2-3 Release 1A is 192K.

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PERFECT FIT

THE NEW VECTRA PERSONAL COMPUTER

FROM HEWLETT-PACKARD.

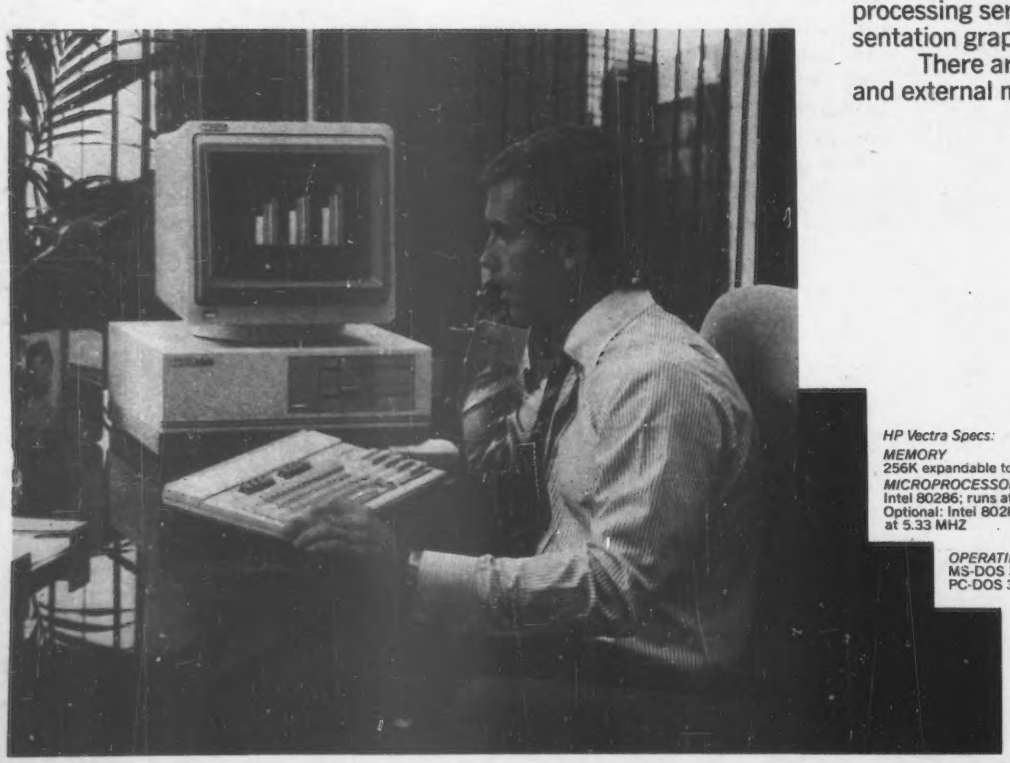
In today's fast-moving business environment, you need a personal computer that has the flexibility to fit perfectly with changing business needs and opportunities. The new Hewlett-Packard Vectra PC is just such a computer: flexible and versatile.

You get the *performance* you need, because you can select the power, speed and memory capabilities that suit you best; the *software* you need, because it's compatible with the IBM PC/AT; and the *hardware flexibility* you need, because it's designed to access a full range of accessories and peripherals.

The HP Vectra PC is a high performance computer. It's 30% faster than the IBM PC/AT. And with the addition of the optional co-processor, it can run even faster.

And since the Vectra PC is compatible with the IBM PC/AT, it runs PC-DOS 3.1 programs—without alteration. Like Lotus® 1-2-3,® MultiMate,™ and R:BASE™ 5000, plus HP's new AdvanceWrite word processing series, TextCharts presentation graphics, and more.

There are several internal and external memory storage



HP Vectra Specs:

MEMORY
256K expandable to 3.64MB

MICROPROCESSOR
Intel 80286; runs at 8MHZ
Optional: Intel 80287; co-processor runs at 5.33 MHZ

OPERATING SYSTEM
MS-DOS 3.1 (compatible with PC-DOS 3.1)

DATA STORAGE
5¼" internal flexible discs (360K or 1.2MB capacity)
20MB internal hard discs
3½" stand-alone flexible discs; 20MB stand-alone hard disc.

options, as well. So you can choose the storage you need now. Or expand as your needs change.

The Vectra PC has high resolution text and graphics capabilities. Color or monochrome displays. And seven expansion slots to add accessories, extra memory, data communications, video options, plus a host of peripherals. Like the popular HP graphics plotters, ThinkJet and LaserJet printers, to name a few.

In all, the Hewlett-Packard Vectra PC is superbly flexible. As a stand-alone, or as an easily integrated addition with HP, IBM and other computer environments. And, because it comes from Hewlett-Packard, you know you're getting a quality product.

Find out how the Vectra PC can fit your needs—whether technical, professional or secretarial. Call 1-800-FOR-HPPC, Dept. 282D, for the name of your local authorized Hewlett-Packard dealer, or Hewlett-Packard sales representative. In Canada, call 1-800-387-3867. *Vectra*

HEWLETT PACKARD
Business Computing Systems

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SOFTWARE & SERVICES

SOFTLINE
Les Gilliam

DP pros need mixed assets

The employer faced with deciding which is the most important asset in a candidate for a professional position on the computer staff — experience or ability — should remember that native ability is unique to the individual and experience can be gained with time.

A person's potential contribution to the good of the firm depends on ability and its application rather than that person's experience.

The employer should focus on a candidate's specific experience. For example, the requirements for the position might call for five years of experience on IBM's 4300 hardware and DOS/VSE operating system and extensive experience with CICS. Nothing is said about ability, trainability or potential for advancement to management or other contributions to the firm. What about common sense, cooperation, ability to work on a team, dedication, acceptance of responsibility and commitment?

We in the computer industry have been accused of being identified more with the computer vendors and their products than with our own employer's business or industry. What about you? Do you consider yourself a member of the computer industry, or are you a member of the energy, airline, retail, transportation, publishing or whatever business your employer is in? But, are employers also guilty of limiting their search to specific experience?

Continued on page 47

Gilliam is a Ponca City, Okla.-based independent consultant with 28 years of data processing experience. He is a regular contributor to Softline.

Boom times seen for DSS

Strong sales forecast despite undefined role

By John Gallant

FRAMINGHAM, Mass. — Although it may be hard to define exactly what constitutes a decision support system (DSS), the market for DSS products is virtually wide open.

That was the finding of a recent International Data Corp. (IDC) study titled, "IBM Software Environment: Financial Modeling and Planning Systems." According to the Framingham, Mass.-based market research firm, vendors of DSS products have an "enormous" market still to penetrate.

IDC said that last year less than 8% of the 1,240 IBM mainframe sites surveyed had installed a DSS package. But that installed base is likely to grow at an impressive rate through the end of the decade, IDC stated. The survey predicted that the financial modeling and DSS software market will grow at a nearly 40% compound rate through 1988. IDC estimated that the market was valued at $182 million at year-end 1984, a figure that is likely to grow to $679 million by 1988.

IDC labeled DSS products as "some of the most widely discussed, poorly understood and intensively hyped products on the market today." Because DSS products are used by decision makers on an ad hoc basis for what IDC called "semistructured" tasks, their usefulness is difficult if not impossible to determine, the report said.

"Despite the fact that the jury is still out on their utility," IDC said, "decision support systems have received a king's welcome by users clamoring for information in an increasingly intensifying busi-

Continued on page 45

MSA unwraps inventory aids

Management Science America, Inc. (MSA) of Atlanta recently announced two mainframe applications for sales forecasting and distribution resource planning.

The MSA Sales Forecasting System is a decision support tool that aids in the development and monitoring of product sales forecasts. It can be used to produce an integrated inventory plan by producing one companywide sales projection based on previous sales statistics that drives distribution, manufacturing, purchasing and marketing operations. The system will reportedly detect sales trends and seasonal patterns automatically.

The MSA Distribution Resource Planning System allows the user to schedule and balance inventory more accurately and to project future inventory needs. The system alerts the user to potential inventory imbalances and consolidates the distribution network's future inventory re-

Continued on page 40

SOFTSCOPE

Notes from the software industry front

Call me. At the recent Software/Expo in Dallas, **Cincom Systems, Inc.**, Cincinnati, announced the opening of its North American Client Support Center in St. Louis. Cincom President Dennis Yablonksy said the St. Louis site will host a 24-hour toll-free user hot line that is expected to provide one-hour resolution for roughly 70% of the support situations it handles.

■

You're in the army now. **Applied Data Research, Inc.** (ADR) of Princeton, N.J., has signed what may ultimately be more than a $23 million contract to provide software for the MIS centers of the **U.S. Army**. ADR said its initial contract with that branch of the armed services was for $6.5 million. If the Army exercises certain options, the contract

Continued on page 45

■ Planpower personal finance expert system was unwrapped by Applied Expert Systems/**38**

■ IDMS/R tables managed with a tool from Business Systems Resources/**38**

■ Uccel releases Tape Management System for Sperry libraries/**40**

INSIDE

Systems Software/**40**

Application Packages/**40**

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Lisp-based financial planning system out

Applied Expert Systems, Inc. of Cambridge, Mass., has announced an expert system for personal financial planning, dubbed Planpower.

Planpower, written in Lisp, is intended to provide expert assistance to professional financial planners. The product runs on Xerox Corp. 1186 AI workstations and is sold in a package including the Xerox AI Workstation Personal Computer Option, which enables it to run software written for the IBM Personal Computer or the IBM Personal Computer XT.

The product includes Applied Expert Systems' Expert Planner software, which emulates the knowledge of planning professionals; Expert Framework, which does the analysis and planning; and Computed Text, which writes the financial plan with observations, recommendations and analysis specific to the client.

The Planpower package also includes data management capabilities, spreadsheet, word processing, English interface and the Xerox 1186. The Expert Planner knowledge base is said to embody 6,000 decision-making rules and the expert knowledge of 125 financial products, including securities and fixed income assets.

With Planpower, financial analysts reduce the time required for analysis and planning for cash and credit and risk management, tax planning, investment management, retirement planning and estate conservation, a spokesman said. A client's financial plan includes recommendations in each area.

Planpower can explain the reasoning behind its recommendations and can test recommendations against any alternative. The system contains intelligent defaults, built-in standard assumptions about financial planning and client data that assigns reasonable values to the facts about the objects in the data base.

The software will drive the Hewlett-Packard Co. Laserjet printer. Shipments are scheduled to begin in January 1986. Powerplan costs approximately $50,000.

Table facility for Cullinet DBMS debuts

Business Systems Resources of Waltham, Mass., has announced the Advance Element File Manager, a table facility for users of Cullinet Software, Inc.'s IDMS/R data base management system running on IBM mainframes.

The Advance Element File Manager gives users screens with which to maintain application reference tables. The product was designed for use with IDMS/R and Cullinet's Integrated Data Dictionary. The Advance Element File Manager is said to enable nontechnical users to build new versions of tables outside of the production system and to update the dictionary and IDMS/R relational tables.

The tables, which contain values and descriptive information for system codes and reference data, are used for editing input and reporting information from the data base. The same tables can be used by an on-line Help facility to indicate to the user the allowable entries in a field. Table member data can be added, modified or deleted independently of the systems that use the tables.

The Advance Element File Manager costs $16,500 and is available immediately.

Interactive Logic updates managing tool

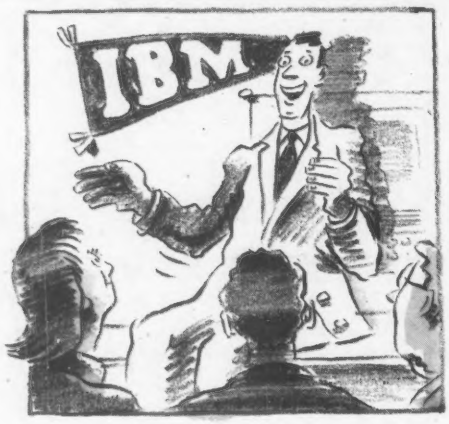
Interactive Logic, Inc. of New York has announced Version 2 of the Scheduling and Resource Management System (SRMS), a project management package for IBM VM/CMS operating environments.

The enhanced release reportedly features intertable and cross-table browsing in full-screen mode based on columns sharing the same domain, additional data base tables to support extended skills inventories and risk and project complexity analysis. Multiple concurrent data base control is established for local as well as remote and distributed data bases, and local private and public data bases can now be configured for multiple access.

A high-performance resource allocation and leveling facility solves the supply-and-demand model using a priority-driven heuristic scheduler. Advancements in the management of adjustable activities and the control of unsplittable activities have also been incorporated.

SRMS was built on a relational data base model and includes an active data dictionary and fourth-generation query logic language patterned after IBM's SQL. The query facility incorporates a structured dialogue manager, macro facility and recursive procedure invocation capability.

SRMS Version 2 costs $73,500, the vendor said.



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Since all companies rely on I/S to provide consistent, high-quality service, IBM offers classes that deal with issues such as: Understanding the value of better service. How to design a strategy for high-quality service. How to implement service-level agreements. And how to plan for growth.

To learn more about the principles and practice of service and network management, consider attending the following courses at the IBM Information Systems Management Institute:

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- Capacity Planning and Performance
- Managing Data Communications Systems
- Managing Technical Network Operations
- Operations Analysis and Management Controls
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To help you find out more about the Institute's curriculum and each specific course, we have recorded complete descriptions on audiotape.

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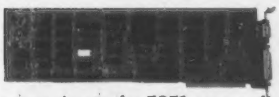
One great idea deserves another.

"My idea was to give our PC users a screen display identical to the 5251."

Our IDEAcomm 5251 is the only Twinax Emulator that lets him do it.

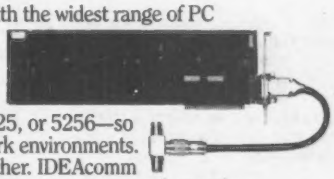


For users accustomed to an IBM 5251 terminal, our IDEAcomm 5251 with the D card option doesn't just approximate the 5251 screen display, it duplicates it. The full 32 display attributes of the 5251 are supported. And the D card is an exact replacement for IBM's monochrome display adapter, including a parallel port, so you don't lose an additional PC slot.

Our ideas for IBM System 34/36/38 users shouldn't surprise you. IDEA shipped the first fully functional 5251 twinax emulator last December. And since then we've added several new features you told us you were looking for.

Now, IDEA offers complete support for IBM's FSU and FTF programs on the host. In addition, there are many third party software packages which support IDEAcomm 5251, including DecisionLink and Smart Link, giving you even greater file transfer options.

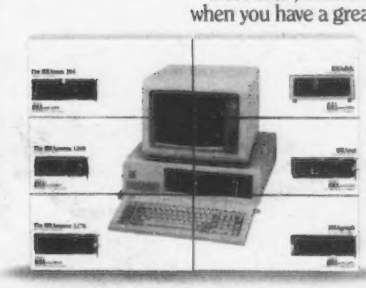
IDEAcomm 5251 works with the widest range of PC printers including Okidata, Epson, Hewlett-Packard, IBM, NEC and many more. The PC printer can be configured as the IBM 5224, 5225, or 5256—so it's compatible with many work environments.



And our ideas go even further. IDEAcomm 5251 supports four logical units so you can run four tasks simultaneously. Our programmatic interface lets programmers easily customize applications to the board through software. IDEAcomm 5251 can be configured for PC and 5250 keyboard modes and we provide templates for both. And we even have a color mapping option which gives you the choice of remapping any of the 5250 attributes to different colors.

Best of all, IDEAcomm 5251 uses only 30K of memory. So when you have a great idea for improving the communication capability of your IBM PC, look to IDEA to make it a reality.

Call us at **800-257-5027** for more information.



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SOFTWARE & SERVICES

SYSTEMS SOFTWARE

■ **Software Diversified Services Co. is offering a software product for monitoring IBM DOS/CICS systems.**

Called Online Resource Control Aid (Orca), the software allows users to view IBM Vtam and DL/1 system components, according to a spokesman. Orca provides 50 displays, including queued resources, storage violations, systems console data, Vsam data set statistics and "wait-on-string" conditions.

A permanent license costs $2,600; the monthly license fee is $130.

Software Diversified Services, Suite 308, 6401 University Ave. N.E., Minneapolis, Minn. 55432.

■ **Axios Products, Inc. is offering Version 3 of Fetch, a package designed to improve IBM CICS/VS response time and storage utilization.**

Enhancements in Version 3 include an automatic installation facility; a reduction in program search requirements by putting high-activity programs at the top of the control table; and a shorter optimizer cycle, said to provide faster response to program loading needs.

Version 3 provides hard copy CICS program loading statistics on demand and at shutdown, the vendor noted. In addition, a display shows the status of individual programs processed by Fetch, including the number of times the program was loaded by CICS and the total use count for the program.

Fetch 3 is available for a one-time fee of $12,000.

Axios Products, 1455 Veterans Highway, Hauppauge, N.Y. 11788.

■ **Mindcode Development Corp. is offering Terminal Manager, a character set editor and function key definer for Digital Equipment Corp. VT200 series terminals.**

Designed for any VAX/VMS system, Terminal Manager allows users to define and download custom character sets, define function keys shift-F6 through shift-F20 in terminal memory plus query and display terminal attribute reports.

Terminal Manager, supplied with program-callable interfaces, can be licensed for $500 for the Microvax I to $3,000 for a VAX 8600.

Mindcode Development, 1915 E. 9400 South St., Sandy, Utah 84092.

■ **National Instruments, Inc. has unwrapped real-time software that provides multitasking capabilities for IEEE-488 General-Purpose Interface Bus (GPIB) or Hewlett-Packard Co. interface bus systems.**

The two modules include a handler kernel that is installed in the operating system and a language interface code that the user includes in the application program. An interactive control program is also included to let users experiment with command structures and troubleshoot bus problems, according to a spokesman.

The real-time handlers support C and assembler languages plus Mtos and Versados operating systems. They work in conjunction with National Instruments' VMEbus products, including the GPIB-1014DP that provides two separate GPIB controllers on a full-size VME board.

Single-quantity prices are $200 each for the real-time handlers and $995 for the GPIB-1014DP.

National Instruments, 12109 Technology Blvd., Austin, Texas 78727.

APPLICATION PACKAGES

■ **An integrated sales tracking and planning package for management control and sales forecasting on Wang Laboratories, Inc. Professional Computers and VS systems was unwrapped by Mitchell Manage-**

Uccel unveils tape library manager system

Uccel Corp. of Dallas has announced the Tape Management System (TMS) for managing magnetic tape libraries in Sperry Corp. data centers.

TMS runs on the Sperry 1100/OS operating system. The product monitors tape usage, location and inventory and protects tapes from unauthorized access.

The user mode of TMS allows each user to create internal tapes and list or change catalog entries of the tapes storied in his or her assigned account. The librarian mode allows the TMS librarian to control and maintain all tapes in the data center library.

TMS is available immediately and costs $10,000.

From page 37

MSA announces two mainframe applications

quirements to allow replenishment planning.

Both are on-line, real-time systems for companies with large manufacturing or wholesale distribution operations. With these systems, a distribution manager can ensure that only the necessary inventory is shipped and stored where it is most needed, a spokesman said.

The two systems, available now, may be purchased separately for $8,000 each.

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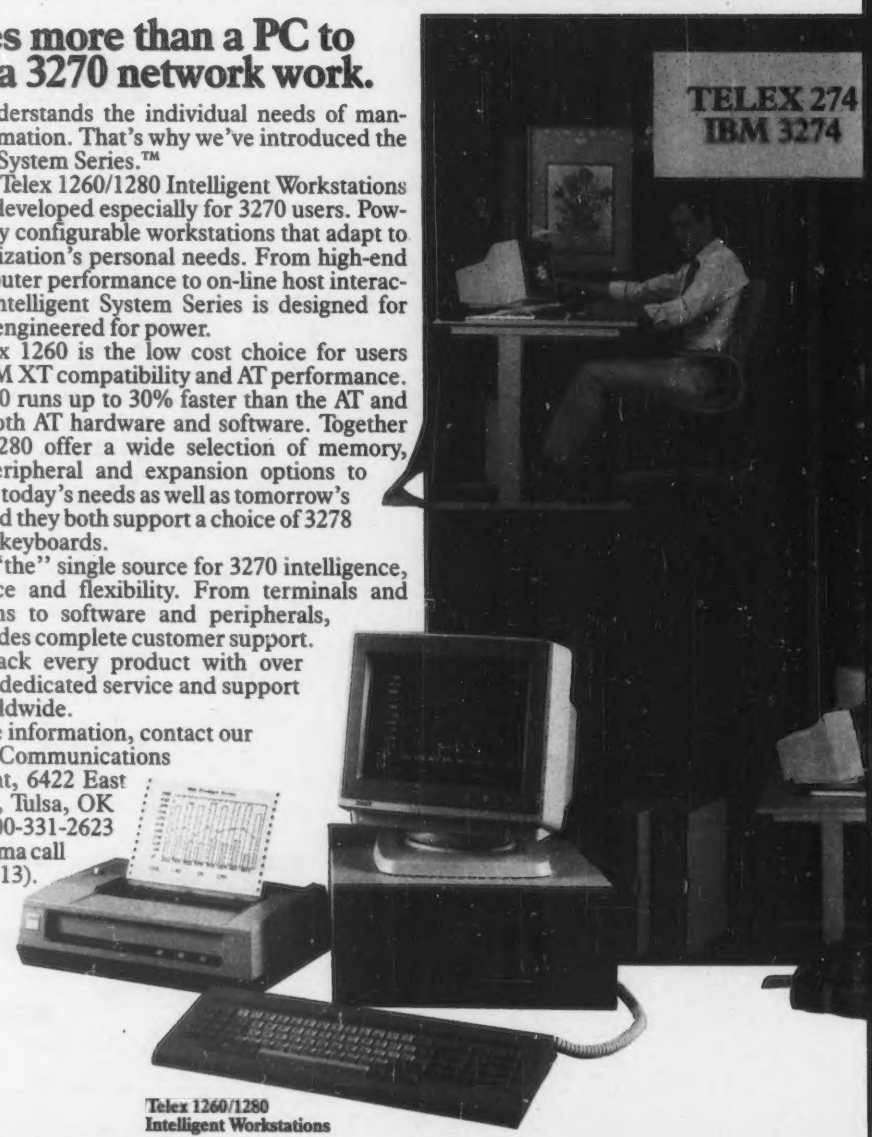
For more information, contact our Marketing Communications Department, 6422 East 41st Street, Tulsa, OK 74135. 1-800-331-2623 (In Oklahoma call 918-628-3113).



Telex 1260/1280
Intelligent Workstations

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ment Systems, Inc.

Called Sales and Marketing Management (Samm), the software works from an integrated data file and manages the progression of a prospect from first introduction as a lead to eventual close as a customer. Samm organizes sales activity by position in the sales cycle and importance of the prospect. Each prospect is assigned a subjective importance rating and an objective rating based on its location in the sales cycle.

There are four integrated modules: sales, sales management, marketing and telemarketing.

Sales consists of six applications said to help track individual activity. These include call reports, prospect strategies and a prospect hot list and automated telephone messages. Sales management provides a view of sales activity within a specific group, region or territory.

Marketing tracks and forecasts product sales and reports on market penetration, product mix and product sales forecasts.

Telemarketing applications also integrate with the central data base and include an ability to manage a 100,000-name mailing list, the spokesman said.

Samm offers 15 preformatted reports plus a select-and-sort utility that reportedly lets users select and prioritize up to 25 menu variables to create more than 100,000 customized reports.

Priced at $38,000 in single quantities, Samm requires 512K bytes of memory and 10M bytes of available storage.

Mitchell Management Systems, Westboro Office Park, 2000 W. Park Drive, Westboro, Mass. 01581.

■ **Control Data Corp. is offering five business and scientific software applications for its Cyber 180 computer systems running under NOS/VE.**

The packages are the IMSL Library, developed by IMSL, Inc.; IFPS, a business package from Execucom Systems, Inc.; MGG and Sciconic/VM from Scicon, Ltd.; and CDC's Uniplot graphics and plotting software.

Priced between $250 and $500 per month, the IMSL Library contains more than 540 mathematical and statistical routines for Fortran application programs.

IFPS reportedly performs risk analysis, develops budgeting and planning systems, produces financial reports and analyzes cash flow. The price ranges from $30,000 to $80,000.

MGG is a program generator that is said to produce a Fortran matrix program from a formulation written in a natural mathematical programming language. The software costs between $2,250 and $6,500.

Sciconic/VM, which costs from $4,500 to $12,500, is a mathematical programming system that reportedly can solve standard linear, complex mixed-integer and nonlinear programming problems. Features include interactive or batch access to processing options plus full or partial print solutions.

Uniplot graphically displays output from a batch program by linking it to graphics devices. With this package, users can preview a plot on a display device, delay selection of a plotting device until plot time or run the plot one or more times on selected plotters without rerunning the application. Prices range from $3,500 to $12,000.

CDC, 8100 34th Ave. S., P.O. Box 0, Minneapolis, Minn. 55440.

■ **Para Research, Inc. has released Version 2 of its Payroll Financial System for IBM System/34 and 36 computers.**

Release 2 reportedly supports shift differentials, tips and up to 15 deductions that can be preset to stop automatically when they reach a preset amount. Paychecks can show vacation and sick days taken and available as well as year-to-date earnings and deductions. The enhanced version also provides two fields for storing deductions from taxable income.

Other upgrades include the ability to issue special checks for reimbursements, bonuses or cash advances; the ability to override deductions at any time; the ability to void and reissue lost checks; the ability to take one-time deductions and feed them into a general ledger account; and the ability to send different check forms to the spool file as separate jobs.

Release 2 comes with current federal, Federal Insurance Contributions Act and state income tax tables, and it includes two sample local tax tables.

At year end, the system automatically makes two copies of the employee master file — one for processing W-2 forms and reports and the other for starting the new year's master file.

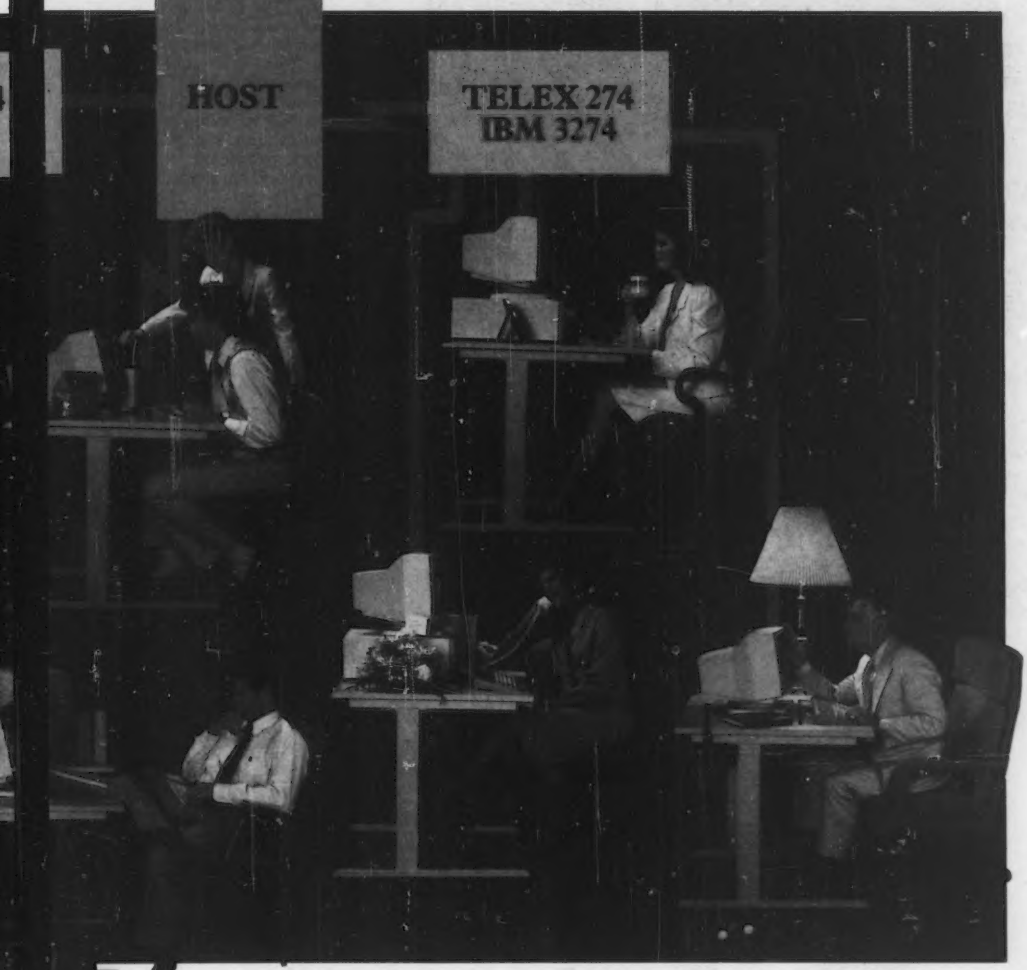
The enhanced version keeps employee records in a personnel file and also provides a separate secured money file to limit access to payroll information. The package interfaces with Para Research's General Ledger Financial System.

Current Payroll Financial System users can upgrade to Release 2 for $500. The enhanced package costs $3,000 for first-time users.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

Continued on page 42

CE AT WORK



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Applications Packages

■ McDonnell Douglas Computer Systems Co. has announced a Municipal Management System (MMS) that is said to help city managers control governmental resources.

Developed by Creative Computer Solutions, Inc., MMS operates on McDonnell Douglas' Microdata 4700, 6000 and 9000 business computers.

MMS consists of 16 modules, including financial, which handles budget, cash receipts and fixed assets; inventory; equipment; payroll/personnel; purchasing; utility information system; licensing, which covers business and animal licenses; parks and recreation; and permits.

All municipal services can share current information; no duplicate data entry is required, according to a company spokesman.

The modules range in price from $1,500 to $8,000.

McDonnell Douglas Computer Systems, 17481 Redhill Ave., Irvine, Calif. 92714.

■ Software International Corp. has enhanced its Accounts Payable system for the Hewlett-Packard Co. HP 3000 computer to support HP's Image data base management system.

The release is said to use data base unload and reload capabilities offered by the HP 3000 and to allow use of function keys between Software International and HP products.

In addition, enhancements to the Accounts Payable application include the elimination of record numbers, replacement of all sequential batch files with an Image data base of batch files, added menu navigation capabilities to let users change from one function or screen to another and an added main menu job submitter.

Accounts Payable leases for $19,000.

Software International , One Tech Drive, Andover, Mass. 01810.

■ A menu-driven program that manages equipment or vehicle maintenance is available from Independent Computer Systems, Inc.

Called the ICS Preventive Maintenance System, the software schedules preventive maintenance tasks, creates work orders for these tasks and posts parts, labor and fuel to the work order.

The package supports five types of work orders, provides unlimited on-line unit history and generates such reports as maintenance schedules, inventory committed, expenses recapitulation, equipment outage and crew scheduling.

The ICS Preventive Maintenance System can run in stand-alone mode or interface to ICS general ledger, inventory, purchase order, order entry or payroll modules.

System requirements include Honeywell, Inc. Level 6/DPS 6 computers running Gcos MOD 400 with Vdam and Sort or Honeywell Level 64/DPS 7 running Gcos 7 with TDS.

A one-time license fee costs $15,000.

Independent Computer Systems, Suite A-201, 10640 N. 28th Drive, Phoenix, Ariz. 85029.

■ Daly & Wolcott, Inc. has enhanced its Credit and Collection software to allow it to interface with IBM System/36 and 38 machines running the Mapics II Accounts Receivable module.

The Credit and Collections package consists of three modules: customer credit profile, payment history and credit and collection information. With the enhancement, the package examines paid and open invoices and produces an aged trial balance report on which invoices are aged on the actual date.

A customer credit profile is also provided featuring date of first sale, high credit amount, high credit date and last payment date.

Prices for the upgraded version are $650 for the System/36 and $900 for the System/38.

Daly & Wolcott, 120 Lavan St., Warwick, R.I. 02888.

■ Integrated Software Systems Corp. has ported its line of graphics software to AT&T Unix-based Sun Microsystems, Inc. workstations.

The products now available for Sun workstations are Dissplа software for scientific and engineering graphics; Tell-A-Graf software for business graphics; and Tellaplan software for project management and reporting.

Pricing involves a first-year investment and annual renewal fees. The first-year investment fee ranges from $1,800 per package in quantities greater than 1,000 to $3,600 for one package. Annual renewal charges range from $288 per package when more than 100 are administered as a unit to $3,600 for a single package.

Integrated Software Systems , 10505 Sorrento Valley Road, San Diego, Calif. 92121.

■ A package for professionals that tracks and bills their time on a project or cost-category basis is available from Software Express, Inc.

Called Professional Time Reporting, the package is said to provide summary information for each project by budgeted, period-to-date or cumulative hours or amounts.

Other features include reports for projected vs. actual expenditures, manual and automatic billing, project analysis by user-defined categories, and profitability reports on a project-by-project basis.

Professional Time Reporting lists for $2,500.

Software Express, 7th floor, 2925 Briarpark Drive, Houston,. Texas 77042.

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If you really didn't want an AT in the first place, just what it could do for you, call or write: Phoenix Computer Products Corp., 320 Norwood Park South, Norwood, MA 02062; (800) 344-7200. In Massachusetts, 617-762-5030.

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For the Ferrari aficionado: yes, we know this is a rear engine car. We are showing the addition of a second engine to symbolize how Pfaster can be added to your PC or XT to increase performance.

SAS Institute Inc. Announces

Lattice C Compilers for Your IBM Mainframe

Two years ago...

SAS Institute launched an effort to develop a subset of the SAS® Software System for the IBM Personal Computer. After careful study, we agreed that C was the programming language of choice. And that the Lattice® C compiler offered the quality, speed, and efficiency we needed.

One year ago...

Development had progressed so well that we expanded our efforts to include the entire SAS System on a PC, written in C. And to insure that the language, syntax, and commands would be identical across all operating systems, we decided that all future versions of the SAS System—regardless of hardware—would be derived from the same source code written in C. That meant that we needed a C compiler for IBM 370 mainframes. And it had to be good, since all our software products would depend on it.

So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

Today...

Our efforts are complete—we have a first-rate IBM 370 C compiler. And we are pleased to offer this development tool to you. Now you can write in a single language that is source code compatible with your IBM mainframe and your IBM PC. We have faithfully implemented not only the language, but also the supporting library and environment.

Features of the Lattice C compiler for the 370 include:

- **Generation of reentrant object code.** Reentrancy allows many users to share the same code. Reentrancy is not an easy feature to achieve on the 370, especially if you use non-constant external variables, but we did it.
- **Optimization of the generated code.** We know the 370 instruction set and the various 370 operating environments. We have over 100 staff years of assembler language systems experience on our development team.
- **Generated code executable in both 24-bit and 31-bit addressing modes.** You can run compiled programs above the 16 megabyte line in MVS/XA.
- **Generated code identical for OS and CMS operating systems.** You can move modules between MVS and CMS without even recompiling.
- **Complete libraries.** We have implemented all the library routines described by Kernighan and Ritchie (the informal C standard), and all the library routines supported by Lattice (except operating system dependent routines), plus extensions for dealing with 370 operating environments directly. Especially significant is our byte-addressable Unix®-style I/O access method.
- **Built-in functions.** Many of the traditional string handling functions are available as built-in functions, generating in-line machine code rather than function calls. Your call to move a string can result in just one MVC instruction rather than a function call and a loop.

In addition to mainframe software development, you can also use our new cross-compiler to develop PC software on your IBM mainframe. With our cross-compiler, you can compile Lattice C programs on your mainframe and generate object code ready to download to your PC.

With the cross-compiler, we also offer PLINK86™ and PLIB86™ by Phoenix Software Associates Ltd. The Phoenix link-editor and library management facility can bind several compiled programs on the mainframe and download immediately executable modules to your PC.

Tomorrow...

We believe that the C language offers the SAS System the path to true portability and maintainability. And we believe that other companies will make similar strategic decisions about C. Already, C is taught in most college computer science curriculums, and is replacing older languages in many. And almost every computer introduced to the market now has a C compiler.

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For the last six months Bank of America, Warner-Lambert, Merrill Lynch, McKinsey & Company, United Airlines and General Electric have been testing the first software product likely to replace the spreadsheet.

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SOFTWARE & SERVICES

From page 37

Softscope: Notes from the industry front

will be worth another $17 million. Among the ADR products involved are the Datacom/DB relational data base management system, Datadictionary, Dataquery, ADR/DL, Roscoe and Metacobol.

■

Reach out and sign someone. Palo Alto, Calif.-based **Micro Focus, Inc.** and **AT&T Information Systems** penned an accord that allows AT&T to place its logo on and sell through its direct sales force and value-added resellers Micro Focus' Level II Cobol Enhanced Technology software. Level II Cobol Enhanced Technology is a Cobol development tool for Unix that runs on the 3B2, 3B5 and 3B15 Unix-based computers.

Also, AT&T and **Unify Corp.**, Sacramento, Calif., announced at Unix Expo that the Unify relational data base management system will be co-labeled by AT&T and marketed by more than 4,000 AT&T account executives nationwide. Unify is said to run on more than 100 different computer types.

■

Striking software oil. **Excalibur Computer Systems, Inc.**, based in Denver, and **Michael Smith & Associates, Inc.**, headquartered in Houston, are undertaking a project to integrate Excalibur's financial and accounting software with Michael Smith's production and reserve software. The combined software, which was designed specifically for IBM and Prime Computer, Inc. processors, will be jointly marketed to users in the petroleum industry.

■

Blue moves. **Madic Corp.** of Santa Clara, Calif., and **IBM** inked an agreement that allows Madic to market IBM mainframes with the Madic Software System. Madic will be selling IBM 4300 series processors with the 22 financial and manufacturing modules of its Madic software system primarily to the manufacturing industry.

■

Audity. **Computer Language Research, Inc.**, Carrollton, Texas, and **Financial Audit Systems** of Raleigh, N.C., developed a bridge between their respective CLR/Fast-Tax tax processing and Field Audit System Technology micro-based auditing tools. The two companies will jointly promote the products to certified public accounting firms and corporations.

■

Office talk. **Southwind Software, Inc.** of Wichita, Kan., and Dallas-based **R Systems, Inc.** have integrated their respective IPT Grafsman graphics and R Office office automation systems. The companies will jointly market the integrated products, which operate under Unix.

■

Westboro, Mass.-based **Data General Corp.** will make the **Intersystems Corp.** M package available through DG's Independent Software Vendor program. M combines an American National Standards Institute version of the Mumps programming language with utilities and data management software. M will be available for DG systems in early 1986.

From page 37

Boom times seen for DSS

ness atmosphere."

DSS products, the report continued, are also a symbol of the changing role of MIS professionals in large organizations — and IDC's research clearly indicates that DSS use is heavier at sites with larger mainframes such as the IBM 3080 series.

Where MIS was once simply the keeper of data and computing resources and the supporter of applications, it "now has the capacity to fill a crucial business function as detailed, up-to-date, readily available information becomes a critical decision-making resource."

Although admitting that no one definition encompasses all DSS products, IDC said they generally offer the following capabilities:

- An ad hoc query facility.
- A comprehensive data base of information from a variety of sources, including in-house systems, on-line data base services, data base management system (DBMS) interfaces and the user's own applications.
- Interfaces for retrieving, manipulating, presenting and storing data.
- Mathematical and statistical models and techniques, and tools for risk analysis and simulation.
- Facilities that allow the user to gather data through time and by business unit.
- Support for specific communications requirements such as messaging, local-area networks and document interchange.

Among the products that fit that description, according to IDC, Execucom Systems Corp.'s IFPS is the leader in the DSS market with roughly one-third of the installed base. With approximately half that share, about 16%, Thorn-EMI Computer Software's FCS-EPS system is the No. 2 DSS product. But FCS-EPS registered the biggest growth last year, having increased its market share from slightly more than 10% in 1983.

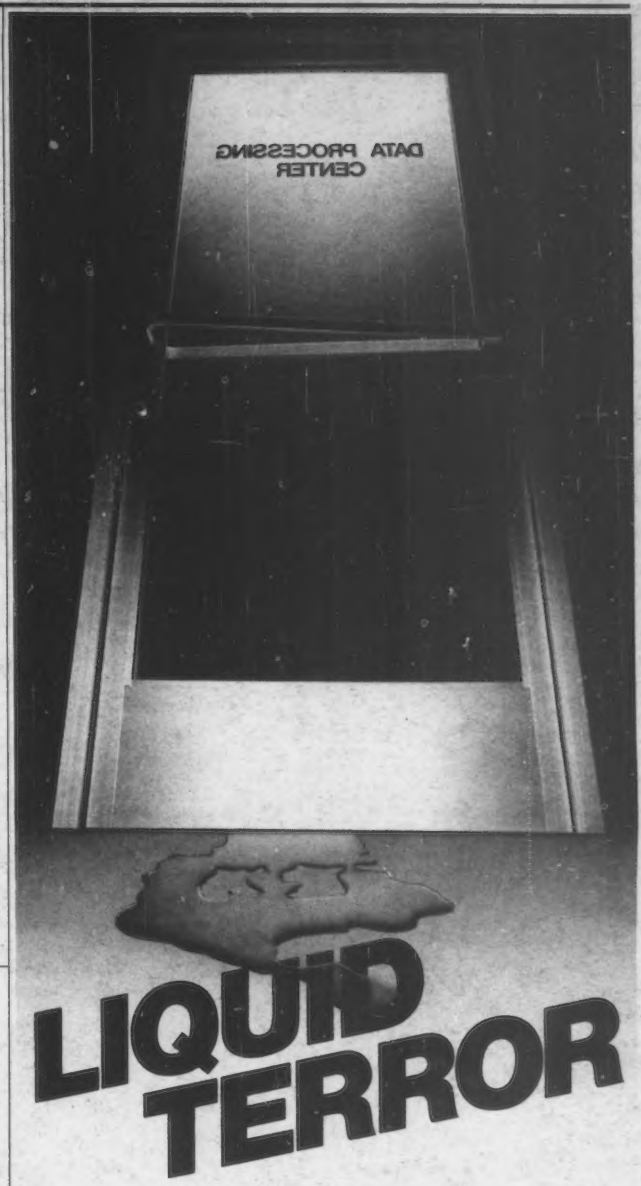
Installed bases that slipped in 1984

Other DSS products whose installed base slipped in 1984 included Computer Associates International, Inc.'s Autotab — 8.7% market share; Comshare, Inc.'s System W — 3.5%; Information Systems of America, Inc.'s Foresight — 3.5%; and Management Decision Systems, Inc.'s Express — 1.7%.

According to IDC, other products such as "lesser" IBM offerings and mainframe-based spreadsheets constitute about one-third of the market. Thus, IDC stated, "The relatively large market share of the lesser lights in the financial planning market indicate that this market has not yet consolidated itself, despite the presence of significant leaders."

IDC's research indicated that almost 20% of all 3080 series mainframe sites had some type of DSS, while only about 5% of IBM 4300 system users had a DSS. Almost 50% of all the installed DSS products were hosted under IBM's MVS or MVS/XA.

Less than 5% ran under IBM's VM alone, and about 14% ran under IBM's DOS/VSE. IBM's DL/1 was the DBMS most widely used in conjunction with a DSS, followed by Software AG's Adabas; Cullinet Software, Inc.'s IDMS/R; and IBM's IMS.



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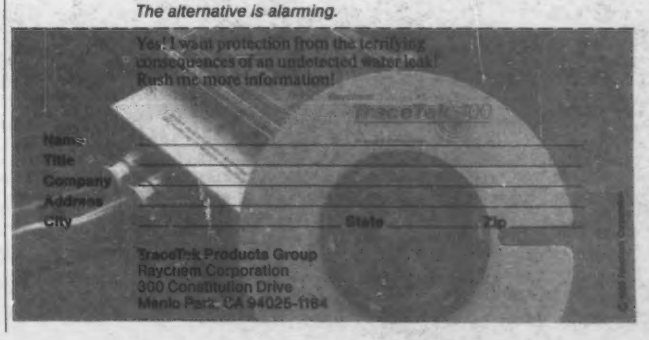

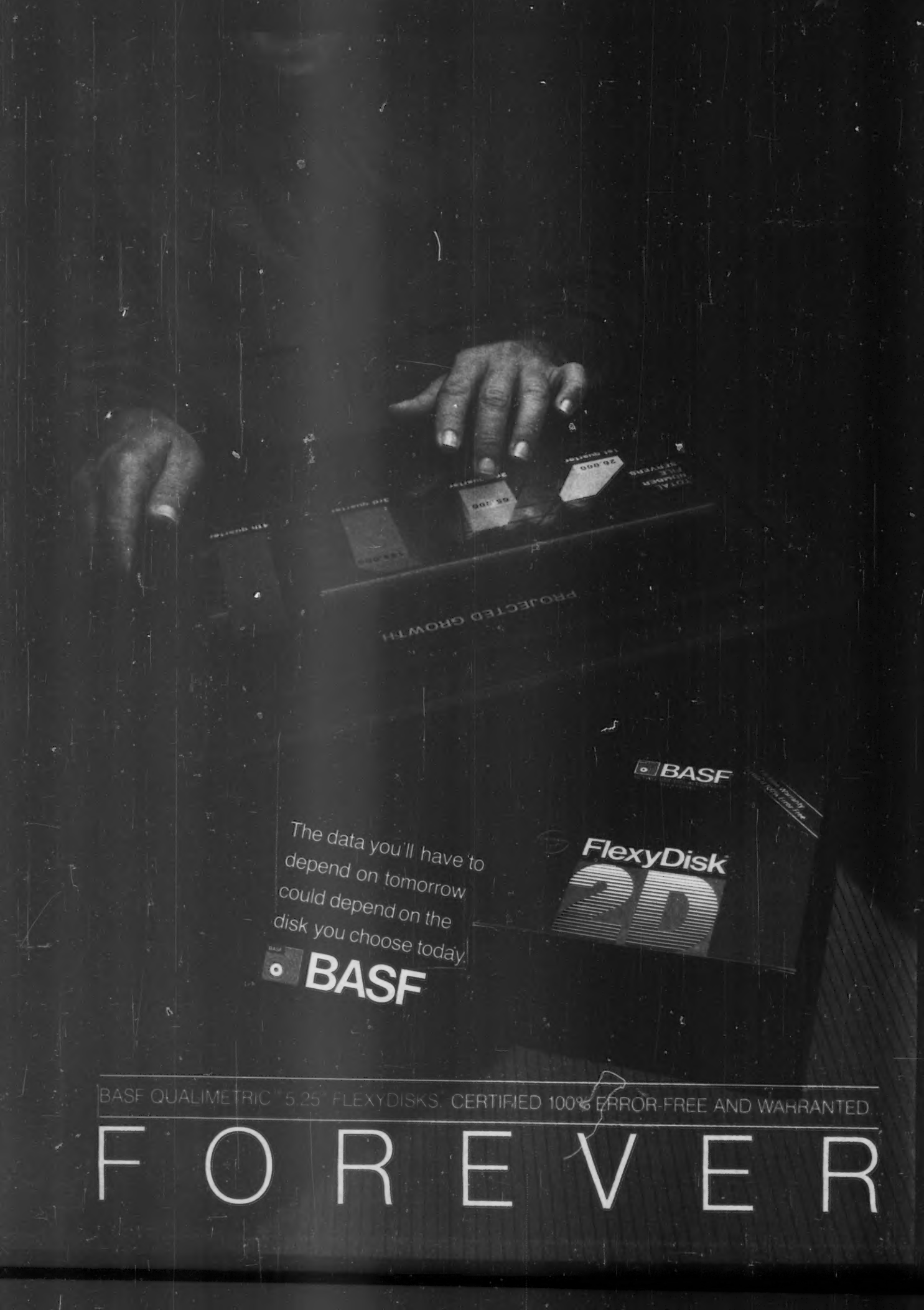
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BASF

SOFTWARE & SERVICES

From page 37

Data processing professionals need a variety of attributes

Let's look at this question first from the perspective of the employee or prospective employee. Do you remember when you were ready to enter the job market? You needed a job. Maybe you were fortunate to have several interviews and even more than one offer. Was your choice of an employer based on the type of computing hardware or software being used? Probably not. If it was a reputable company that offered a good salary, opportunities for advancement and was in an acceptable location, you were glad to get the job.

But now you have become dissatisfied because of limited opportunities, less than competitive wages or specific unacceptable circumstances. Or worse yet, you are committed to a career with your company, but it is in extreme financial difficulties, and a cutback in staff may include you.

When starting to search for other opportunities, you realize that your specific experience is not in great demand on the open job market. Maybe the hardware you have been working on is not widely used. Maybe the software with which you have worked for many years is unique to your company or industry and not used by other employers.

What is the likely result of such a situation, which is happening every day all across the country? I submit to you that more and more computer professionals are beginning to think about how marketable their ability and experience is. Loyalty to your employer is an admirable quality, but the employer cannot guarantee you a lifelong career. When your firm seeks protection under Chapter 11 of the Federal Bankruptcy Act, all the loyalty in the world will not save your job. You are on your own and must try to market whatever skills and knowledge you have to offer to whoever happens to be hiring at the time. Are the odds in your favor? Do you have experience with hardware and software that is in broad use?

> ”
>
> *When your company seeks protection under Chapter 11, all the loyalty in the world will not save your job.*

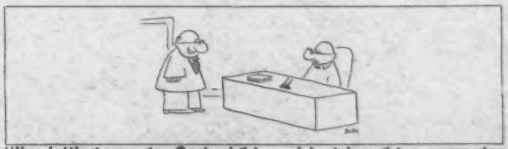
Now, what about the employer? Let's say you are the DP manager and have just lost your chief programmer on the most important application project of your career. The chief executive officer is personally interested in the project being completed on schedule, as the company's ability to compete depends on the automation of this part of the business. Are you going to conduct a thorough search of all possible candidates to find the person with the most native ability, common sense, dedication and commitment, regardless of what type of hardware and software experience he has gained? Of course not.

You will search for the best available candidate with the specific required experience, and the search will be quick. Is there a possibility you are missing an outstanding candidate who could contribute more significantly to the firm in the long run? Yes, but the pressure is on, and the project requires someone who can go to work now — without attending classes or going through a learning curve.

What is the right answer here? Or is there one? Is this situation having an impact on users of specific hardware or software or on the industry as a whole? Does it ever influence the decision as to which vendors' products are installed in the data center? Does it affect a company's recruiting success?

To the employer, I suggest greater consideration be given to ability as opposed to experience. Of course this requires advance planning to provide time for recruiting and training. But you will have a wider choice of candidates, and it will allow you to build a staff that can have a more significant long-range impact on the success of the firm.

To the computer professional, I hope you are gaining a better understanding of the realities of the employment process — that supply and demand are at work in the computer field. I hope you will continue both to enhance your ability and to broaden your experience. I suggest you give attention to the marketability of both your ability and experience. Don't be caught off guard. Assume responsibility for your own career.



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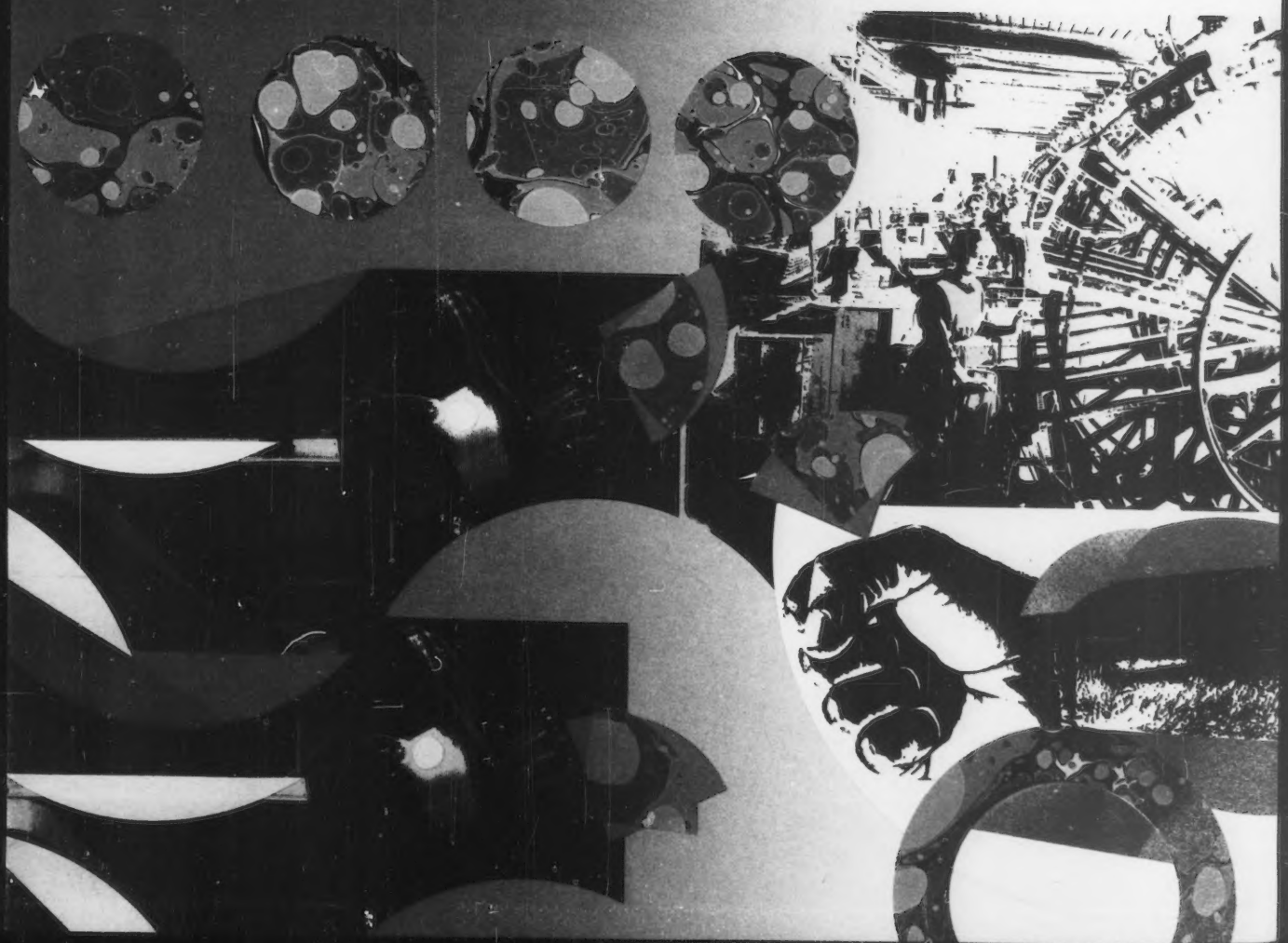
COMPUTERWORLD

Update

October 7, 1985

Robots move in



Update

A look at robotics in the U.S.

By Glenn Rifkin
Update Editor

"There was a time when humanity faced the universe alone and without a friend. Now he has creatures to help him; stronger creatures than himself, more faithful, more useful and absolutely devoted to him. Mankind is no longer alone."
— *I, Robot* by Isaac Asimov (1950)

In the sloping hillsides of western Pennsylvania, innovation in high technology is the last thing a visitor might expect to see amid the torpor of the steel industry. But at X-Mark Industries in the shopworn village of Washington, the economic outlook is bright, and that is owing, at least in part, to a vigorous commitment to robotics.

When Sam Bruckner, president of the precision metal fabrication shop, installed his new robot six months ago, it raised eyebrows around the local business community. It was unusual, if not downright crazy, for a tiny operation (60 employees, $3.5 million in sales) to be investing in a technology traditionally reserved for huge automotive manufacturers.

Bruckner was undaunted. Though he has no technical background to speak of, he is a pragmatic businessman who is unafraid of experimenting with the latest high-tech wizardry. He has parlayed personal computers, lasers and now robotics into increased revenue. His employees, far from being cowed by the technological influx, love it.

The GMF Robotics, Inc. robot has, contrary to popular belief, created rather than killed jobs at X-Mark. The spot-welding machine has not only taken over the boring and repetitious welding chores that saddled several employees but has proven to be a tireless, far more efficient worker than the people it replaced. Those workers, as well as three new hires, have been moved to other tasks created by the incoming new business that X-Mark has bid for and won.

"We bought the robot to increase our work load, not to lay off people," Bruckner says. "We talked to our welders beforehand and told them that if we wanted to compete in world markets we would need the best technology. They were real enthusiastic. They don't want to let the competition knock our socks off."

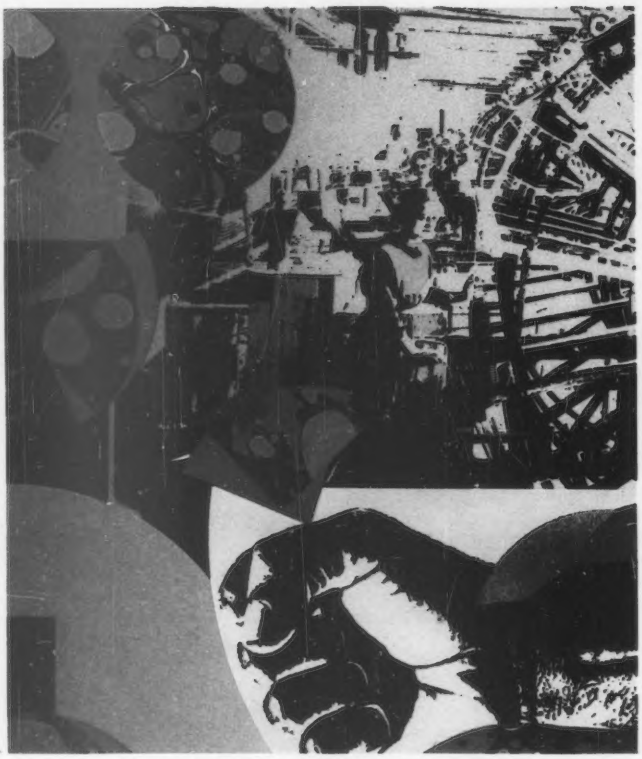
With the robot now a prized member of the work force, X-Mark's business is taking off. Revenue doubled in one year, and the company will double its plant size by the end of 1985. Though there are no definite plans, Bruckner has little doubt that he will bring in more robots soon.

The welders themselves are proud of the new machine, and though none has computing expertise, several are learning fixturing (the precise gauging) and programming for the robot. Their friends in the neighborhood bars continue to predict impending job displacement at the mechanical hands of these new machines, but the welders are devoted converts.

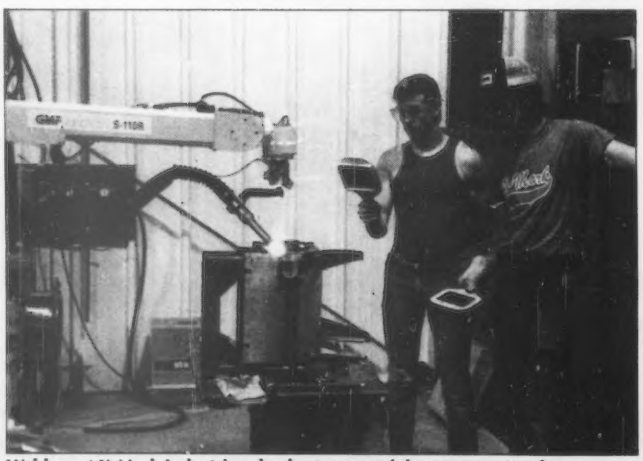
Says Bill Bedillion, an X-Mark welder who works closely with the robot, "When it gets up and starts walking around holding blueprints, then I'll get worried."

Though it won't be tomorrow, Bedillion may indeed face that worry someday. Robots are no longer simply products of fertile sci-fi imaginations. These androids with the ability to see, touch and move around already exist in prototype stages. Work continues in both academic and industrial labs around the world to close the gap between real life and literature.

Unfortunately, the field of robotics is a two-headed monster that has, at its heart, divergent goals and conflicting ideals. While some imaginative researchers and scientists pursue the elusive anthropomorphic robot of movies and television, the economically driven field of state-of-the-art industrial robotics seeks to enhance bottom-line profits and increase productivity on the factory floor.



'When [the robot] gets up and starts walking around holding blueprints, then I'll get worried.'
— *Bill Bedillion*
X-Mark Industries



Welders at X-Mark Industries check progress of the company's robot.

Science fiction has, in fact, cast the field of robotics into confusion and misunderstanding for both workers and managers who fear that R2D2-like creatures will cost fortunes and steal jobs. Robot purists, on the other hand, believe that the mechanical arms swinging to and fro along auto assembly lines have no more claim to the name robot than monkey wrenches and pliers.

It is these robotic arms, however, that make up the current commercial robotics industry. These industrial tools, incorporating vision, sensing and someday mobility, will undoubtedly usher in any futuristic wave of mechanical men. Though Japan has attracted much attention with its extensive use of robotics, this *Computerworld* Update will take a look at the field of robotics in the U.S. and visit several user sites — both large and small — to see these modern marvels at work. Update will also examine the current research that is attempting to improve today's robot performance and push out the frontiers of the robotics of tomorrow.

The state of the industry

For users such as X-Mark, the foray into robotics has been a rewarding experience. That cannot be said for many on the other side of the robot — the manufacturers. Though the industry has grown enviably in the past five years (25% to 35% annually), robotics is a frustrating and costly field for its players. Few companies show a profit.

Despite the hoopla that heralded the robot industry in 1980 and 1981,

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COVER ILLUSTRATION BY KAREN WATSON

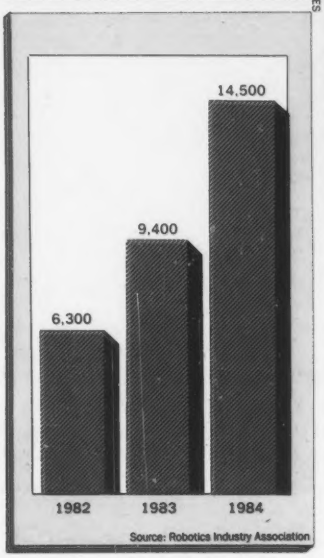
Update

the expected wells of plenty have come up far drier than anticipated. There are only an estimated 16,000 robots installed in U.S. factories, compared with 60,000 in Japan, according to the Robotics Industries Association (RIA). Projected sales for 1985, though up 38% over the previous year, total just $545 million. These aren't numbers that make industrialists tingle with excitement.

For industry watchers such as Laura Conigliaro of Prudential-Bache Securities, Inc. in New York, this "profitless prosperity" is frustrating. "It's been so tedious and difficult and frustrating to watch some pretty smart people, whether in a large company or small company, scratching their heads and saying, 'What the heck is a workable strategy for this industry, if in fact there is one?' Ultimately, there might be a cogent and consistent approach you can take, but it certainly is not evident right now," she says.

The problem, she concludes, is that robotics is a "solutions-based industry with heavy engineering content." Gerald Michael, a consultant with Arthur D. Little, Inc. (ADL) in Cambridge, Mass., adds, "The top line has been increasing smartly, but the bottom line hasn't been keeping up. By the time revenues filter down to the bottom line, they have have been taken up by expenses and research and development."

U.S. ROBOT POPULATION
(INSTALLED BASE IN UNITS)



MITCHELL J. HAYES

Robotics has attracted a strange and diverse group of companies. Fortune 500 giants, such as Allegheny International, Inc., United Technologies Corp., General Motors Corp., IBM, Westinghouse Electric Corp., General Electric Co. and Textron, Inc., entered the market. Some are still in it, and "some of them wish they weren't," Conigliaro says. In addition, many start-ups with specific expertise in one discipline or another also jumped in. Companies such as Unimation, Inc., Cincinnati Milacron, Inc., GMF Robotics, and Asea Robotics, Inc. dominate sales.

Ironically, IBM, which usually dominates any market it decides to enter, is a somewhat quiet, albeit successful, player in robotics. According to Michael, IBM's projected 1985 sales will total $16 million, which likely wouldn't match a week's worth of Personal Computer sales.

Nonetheless, IBM is committed to selling its small, light-assembly, selective compliance assembly robotics arms (Scara) robots (which they import from Japan) along with the internally designed $100,000 Model 7565, a larger, more flexible assembly unit.

According to John Klein, general manager of manufacturing systems products at IBM, the company began investing in robotics in the early 1970s to facilitate the internal use of the technology. By deciding to sell robots, "we are making a statement about our total commitment to manufacturing," Klein says.

Of the dozens of other companies that joined the fray early on, many have gone belly up or quietly folded their cards, taken their losses and slunk away. "The shakeout is going on, and the number of active players is considerably smaller," Conigliaro says.

She points out that the need for robotics has not disappeared despite the industry's difficulties. Less competition should provide a boost to the remaining vendors. Analysts are confident that profitability will come to more than just a handful in 1986 or 1987.

"It's going to be a left-foot, right-foot, grind-it-out industry where you develop an expertise in a certain application and hope to add a second and third application until you get into a groove," she explains. Ultimately, as the technology improves, the market will open up.

Root of the problem

U.S. firms have had a notoriously tough time adjusting to the realities of modern manufacturing. Productivity growth between 1970 and 1980 was a paltry 28% compared with 102.1% growth in Japan, according to the U.S. Bureau of Labor Statistics. Industrial automation has been slow in coming to this country, and robotics has suffered along with related technologies. Outside of the automotive industry, which employs

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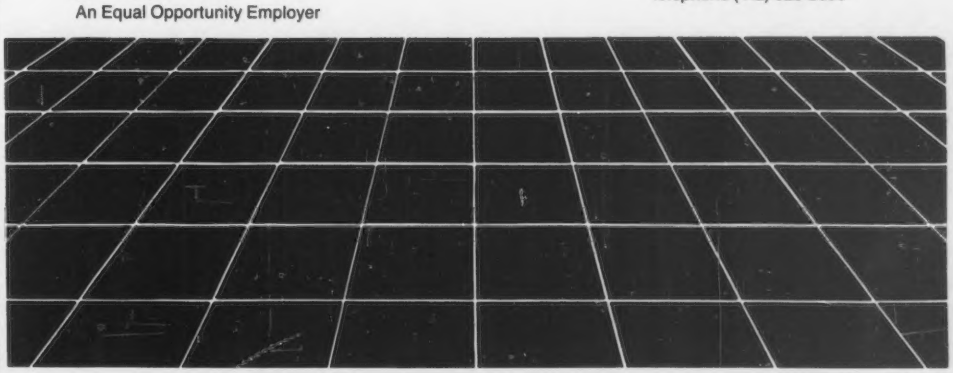


Update

35% of the country's robots, very few industries have embraced robotics in a significant manner. The Japanese, while enjoying no particular technological advantages, committed themselves to robotics in a manner that American robot manufacturers envy (see story Update/11). As early as 10 years ago, the Japanese government initiated incentive programs to aid domestic robot suppliers and encourage the use of robots. These incentives include government-sponsored research and development projects, tax benefits to manufacturers and users as well as depreciation allowances for robot users.

Though industry groups such as RIA have lobbied for similar incentives in the U.S., their voices have been a whisper in a wind of indifference.

"The lack of reindustrialization in the U.S. hamstrings us," says Hal Bloch, vice-president of marketing for Unimation, a subsidiary of Westinghouse and the first robot maker. "While the auto industry is mounting a herculean effort, the trend across the rest of the country is to export manufacturing offshore. That's something we'll regret in 10 or 20 years."

Top management in U.S. companies must be thoroughly convinced of the advantages of robotics before considering a purchase. All decisions, Bloch points out, must clear the return-on-investment hurdle before being approved. This shortsighted approach may save cash in the short run but could affect the very survival of the business in the long term, he adds.

"In Japan, the commitment to automation transcends the simple return-on-investment process," Bloch says.

For John Fife, manufacturing engineer for Snapper Power Tools in Smyrna, Ga., it took two and a half years of "intestinal fortitude" to convince management to spend $110,000 on its first robot. Though the response has been positive to the added benefits the robot delivers, Fife doesn't anticipate an easier time in selling further automation equipment to the powers at the top. "It's always going to be a struggle with management," he says. "They responded well to this, but you just don't win them all."

'It's going to be a left-foot, right-foot, grind-it-out industry where you develop expertise in an application and hope to add a second and third application until you get into a groove.'

— Laura Conigliaro
Prudential-Bache Securities, Inc.

Better robots, response

The robot industry has added its own handicaps to the battle. The industry, says Allen Gilbert, vice-president of advanced product development for American Robot Corp. in Pittsburgh, has long sold itself on promises — promises that have not been kept. Stability of the products that have gotten out on the factory floor has not been very good from any of the manufacturers, he states.

"Factories are not coddled environments," Gilbert says, "which means that the requirements for stability are much more significant. Short of things like banking and airline reservation systems, the fault-tolerance requirments for most computer systems out there today are not all that high. And when you go into a factory, people tend to take a very dim view of systems that go down and stop the automation line." Because the field is relatively new and untamed, potential buyers have been inundated with confusing and conflicting messages from the overabundance of robot firms. "Customers are sitting there hearing all sorts of claims," says Clare Cox, marketing communications manager of Automatix, Inc., a robot and vision system maker in Billerica, Mass. "They want to know what difference you can make, and if you have nothing to show, that's tough."

The claims are one thing; delivering a usable system is quite another. "The hard part is matching your technology with the job to be done," Cox explains. "It's fine to do something in the lab in Billerica, but to get it to work on a job site can be tough."

Initially, robot makers were turning out general-purpose, out-of-the-box robots almost exclusively targeted to spot-welding or materials handling tasks.

These general-purpose machines needed to be shoehorned into environments that were neither ready nor particularly willing to accept robots. "The vendors were expecting the users to know what to do with them," says Dick Johnson, manager of product and marketing planning for GMF Robotics.

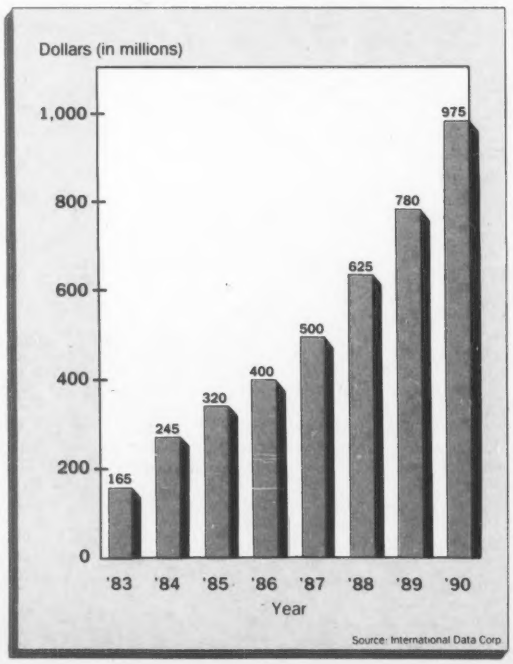
Despite support from the vendors, customers found that the task of integrating a robot into the factory environment was time consuming, costly and riddled with problems. Users were not pleased, for example, to find that the cost of equipment to position and feed the moving parts for the robot on an assembly line could be three times the price of the robot. Also, the complexity of programming for users who rarely possess programming skills causes numerous headaches.

The bulk of applications, according to Gilbert, have

See **ROBOT** UPDATE/6

MITCHELL J. HAYES

U.S. DEMAND FOR ROBOTS BY VALUE, 1983-90



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Update

ROBOT from UPDATE/4

been relatively dumb and imprecise. Users now are looking for more sophisticated, precise functions for their robots, which they want to run at high speeds.

"The applications are getting harder and harder, and you can make fewer and fewer assumptions," Gilbert admits.

Many corporations, initially interested in robots, are simply finding other ways in which to address their needs.

Industry at the crossroads

Since its stumbling start, the robotics industry in the U.S. recently has picked up a perceptible bit of momentum. U.S. robot suppliers recorded a 243% jump in new orders in the first quarter of 1985 over the same period in 1984, according to RIA.

More than 1,800 robots were shipped, compared with 900 a year earlier.

General Motors, the leader in robotics usage in the U.S. from the start, plans to raise its installed base of machines from 5,000 to 8,000 by the end of this year.

Several large automotive manufacturers, such as GM, Ford Motor Co. and BMW of North America, have purchased equity shares in or have otherwise staked some of the small, independent robotics companies to life-giving deals, trading cash for development work on robotic systems.

For the industry, this breathing room provides a welcome chance to examine options.

It is becoming apparent that success in the robotics world will require something more than just a six-axis arm and an aggressive sales force. There are certain frontiers that must be conquered: higher speed and lower cost along with greater flexibility.

General-purpose machines appear to be a dead end.

PHOTO COURTESY OF AUTOMATIX, INC.

Robot at work on automotive assembly line

According to Dr. Tomas Lozano-Perez, associate professor in MIT's artificial intelligence lab, robotics in factories is an economic not technical issue. The Japanese, he points out, are using robots for the same applications as users here, but it is a question of magnitude.

'They've done just an amazing amount of special-purpose engineering in order to get automation," Lozano-Perez says.

Taking that lead, GMF Robotics, a joint venture between GM and Fanuc Ltd. in Japan, embarked on a different strategy from most of its predecessors.

Rather than produce a general-purpose unit, the company concentrated group efforts on specific target applications, such as arc welding, electronic assembly and vision products.

With this strategy (and the not-insignificant backing of GM) GMF Robotics has, in just three years, become the leading robotics vendor in the U.S.

According to Prudential-Bache, GMF Robotics already controls more than 30% of the robotics marketplace with sales three times greater than its nearest competitor. In fact, GMF Robotics, with its high-volume and low-cost approach, has been cited as the reason for the stalled growth of previous marketplace leaders Unimation and Cincinnati Milacron.

GMF Robotics has also pushed toward more sophisticated robot applications, such as vision, off-line programming (see story Update/13) and networking. It recently announced a robotic programming language, which is called Karel (in honor of Czech playwright Karel Capek who coined the term "robot"), that addresses robots and factory automation specifically rather then relying on old languages written for numerically controlled machine tools.

While other segments of the computer industry seek innovation to increase market shares and open up new niches, robotics must push out the frontiers of usefulness, flexibility, cost and ease of use in order to survive.

What users are doing

Though the automotive industry pioneered the use of robotics in this country and continues to be the single largest user, robots are making headway in other markets. As sophistication and flexibility increase, the opportunity for these mechanical marvels to move away from the din of the automotive assembly line into more precise, clean-room activities expands formidably.

Industries such as electronics, aerospace and security services are all tapping the potential of the robot. In addition, with research help from universities such as MIT, Carnegie-Mellon in Pittsburgh and Stanford in Palo Alto, Calif., robotics is being married to various forms of artificial intelligence and expert systems.

In this manner, special-use robots are appearing everywhere from space shuttle missions to the cleanup operation at Three Mile Island in Middletown, Pa. With ever increasing sophistication and functionality, these machines are taking on complex and dangerous missions once reserved for humans.

The military has shown tremendous interest in robotics, and major funding from the U.S. Department of Defense's Defense Advanced Research Projects Agency (Darpa) has fueled several large-scale projects encompassing private industry and academia. Darpa, for example, has invested heavily in walking machine technology and autonomous land vehicles [CW, May 6].

For users with more mundane concerns, the pioneering work accomplished in research labs will translate into better and cheaper machines. For these users, the leading edge today means little more than satisfactorily installing and running the robots in a cost-effective way.

Management is generally unconcerned about "Star Wars" technology, preferring to worry about cost justification and profits.

As robotics moves out toward other industries, the means by which these robots are going to reach the end user has become key, according to Michael of ADL. It is no longer feasible for vendors simply to provide a robot in a crate to users.

"Most vendors are realizing that that is not enough, particularly as you address users who don't have a lot of experience with robots," Michael says.

These untested markets require systems engineering, applications engineering and integration of the robot into the work environment.

Cropping up as middlemen are systems houses that offer integration. The drawback to systems houses, of course, is that they very often do not possess a working knowledge of every brand of robot. Systems houses may be more suited to helping customers create applications rather than with purchase and installation issues.

For the potential user, robots bring the promise of lower costs and higher quality. Though many of these machines fail to live up to that promise, the success rate is growing. As Michael puts it, "Once the robot is programmed to do a job, it will do it repeatedly, consistently and forever."

See **ROBOT** UPDATE/8

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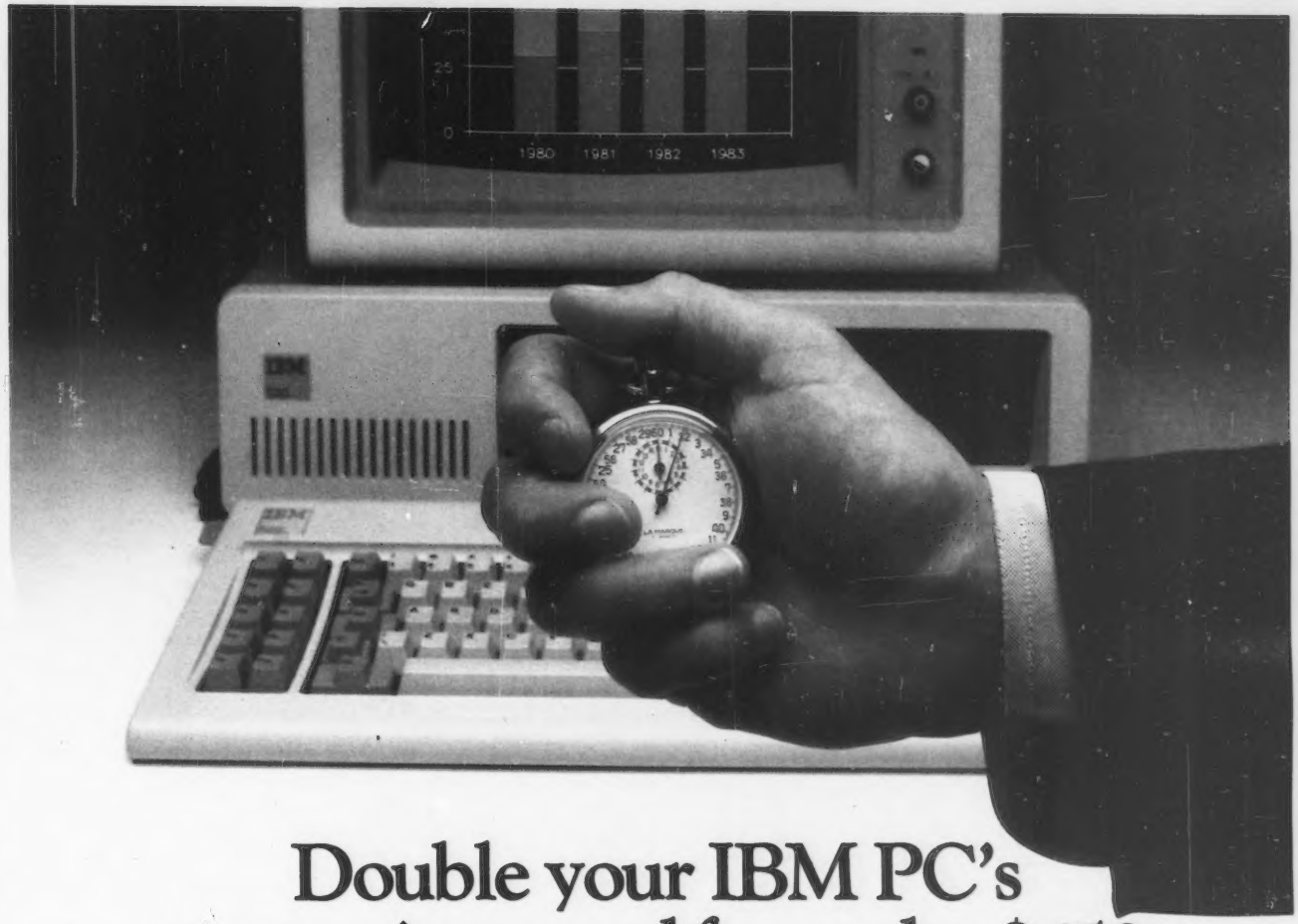

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Update

'People were relieved to find that robots were so stupid that they couldn't do anything without human help. They didn't gobble up jobs. They were, in fact, just another piece of equipment.'

— Richard Beecher
General Motors Corp.

ROBOT from UPDATE/6

Three years ago, just 1,500 robots worked in GM plants. By the end of 1985, the number will reach 8,000. The largest single user in world, GM has spearheaded major efforts in computer-integrated manufacturing, encompassing robotics, computer-aided design and manufacturing and other forms of factory automation.

GM introduced the Manufacturing Automation Protocol (MAP), a seven-layer protocol based on emerging International Standards Organization and Open Systems Interconnect standards. MAP is thought the likely winner in the race to create a network standard for computer-based factory automation.

According to Richard Beecher, manager of advanced manufacturing engineering at the GM Research Center in Warren, Mich., the company's overriding commitment to automation makes cost justification of robots a minor concern.

Though cost justification is still required, it is done on an application-by-application basis within each individual division, he says.

Some issues, Beecher points out, such as safety, override cost justification. "If a job is real nasty for a human, we put a robot in there without cost justification," Beecher says.

Though GM has a relatively high number of robots installed, the total is miniscule compared with the company's several hundred thousand employees. The robots' presence has done nothing to change corporate culture, Beecher says, though GM workers were concerned when robots were first introduced.

"People were relieved to find that robots were so stupid that they couldn't do anything without human help," Beecher recalls. "They didn't gobble up jobs. They were, in fact, just another piece of equipment." Under union contracts, GM workers cannot be displaced by technology, so while robots took over the boring, repetitious occupations, such as spot welding, materials handling and spray painting, human workers were reassigned or upgraded to other jobs.

Now an integral part of the factory work force at GM, robots have "become old hat" Beecher says. "They've been dramatized way out of proportion. More and more will come in as components of larger, integrated automation systems." GM uses robots from a variety of vendors, including Unimation, Cincinnati Milacron as well as its own spin-off, GMF Robotics.

Using its own research along with innovations from GMF, GM expects major advances in vision, end-effector (robot hands) flexibility and mobile robots.

"Vision is where the action will be in the future," Beecher claims. "Unit by unit, there will be more applications for vision systems than robots."

GM is at work on faster, more complex, mobile robots, and Beecher is optimistic about the coming changes.

"I find the horizon moves toward us faster than we to it. It's moving so rapidly that it's hard to talk about the future. People will think I'm smoking something," he says.

Unlike an industrial giant firmly committed to robotics, small manufacturing operations often find it tougher welcoming such new technol-

See **ROBOT** UPDATE/10

SCIENCE/SCOPE®

The U.S. Department of Defense has given two of its four top money-saving awards to Hughes Aircraft Company for proposals that will cut costs by nearly $275 million. The Contractor Value Engineering Achievement Awards honor defense contractors for helping to trim defense costs during 1984. The Air Force cited Hughes for saving $172.8 million on the Imaging Infrared Maverick air-to-surface missile over the life of the contract. The Navy honored the company for reducing projected costs on the UYQ-21 data display system by $101.5 million. Hughes also contributed to the savings achieved by FMC Corporation, which won the Army award for cost-cutting efforts on the Bradley Fighting Vehicle System. The Value Engineering program was created to cut production costs without affecting performance, reliability, quality, maintainability, and safety standards. Last year the armed forces approved 34 Hughes VE proposals for total cost reduction exceeding $296 million. Since 1964, Hughes military customers have approved 705 changes on 52 programs for total savings of $887 million.

An electronics unit that took six years to complete will operate for 12 seconds when it plunges into the skies of Jupiter this decade. The device, called a pyro control unit, is a key element of the Galileo probe that will be launched in 1986. Armed with seven scientific instruments, the probe will penetrate the atmosphere of Jupiter and, in less than an hour, collect data that will feed scientific thought on planetary evolution for years to come. Tiny explosive bolts in the pyro control unit will fire at three intervals to deploy a small parachute, blow away the probe's aft heat shield (in turn triggering the opening of the probe's main chute), and extend the forward heat shield. The unit also will turn on an instrument for measuring the size and distribution of cloud particles. The circuitry of the unit has been built to withstand forces 10 times the pressure and 350 times the gravitational pull of Earth. Hughes built the Galileo probe under contract to NASA.

A U.S. Army laser device has proven to be extremely reliable in tests. The Ground/Vehicular Laser Locator Designator (G/VLLD), which determines distances to targets and illuminates targets for laser-homing weapons, achieved its goal of operating a mean time of 100 hours between failures. G/VLLD systems have operated for the equivalent of more than 108,000 designation missions and more than 45,000 ranging and location missions for a period exceeding 600 hours. The Hughes device can be mounted on armored vehicles or used with a ground tripod.

Computers help production engineers spot problems before they occur at a facility for making printed circuit boards for advanced missiles. One computer at the Hughes facility in Tucson, Arizona, monitors amperage settings, temperatures, pressures, pH, conveyor speeds, and building utilities. The computer maintains a six-month history on every reading so engineers can study trends in processes and alter parameters before problems arise.

Hughes is seeking experienced engineers and scientists to further develop advanced spacecraft systems and components for communications satellites—successors to the 20 that will have been launched from the space shuttle by 1986. Openings are in the fields of: software, computers, and data processing systems; electrical components; microwave/RF communication systems development; on-board spacecraft electronics and control systems; satellite design, integration, propulsion, and electrical power system development; spacecraft manufacturing, systems test and evaluation; GaAs applications R&D. Send your resume to Dan Frownfelter, Hughes Space & Communications Group, Dept. S3, S4/A300, P.O. Box 92919, Los Angeles, CA 90009. Equal opportunity employer. U.S. citizenship required.

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HUGHES

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Update

Robot security guards: R2D2 on the alert

By Glenn Rifkin

The general public, were it confronted with what industrial automators call robots, would undoubtedly be disappointed. These mechanical arms bear no resemblance to the androids and metal marvels created by clever dramatists and science fiction writers.

Perhaps that is why a small start-up company in Woburn, Mass., has gotten so much attention lately. Denning Mobile Robotics, Inc. is on the verge of beta testing a true-to-life mechanical "man" that can move, see, hear and even smell. Best of all, this robot has a practical application and may well serve as the bridge between fantasy and fact.

The Denning robot, which bears a striking resemblance to its movie cousin R2D2, is being developed specifically for the security business. The mobile robot, equipped with ultrasonic sensors, video cameras, gas and fire sensors, an infrared tracking system and a powerful Motorola, Inc. 68000 microprocessor, is designed to patrol and monitor buildings for a long list of environmental and human threats.

According to Benjamin B. Wellington, vice-president of Denning, the robot will sell for between $45,000 and $65,000 and will operate at half the price of a human counterpart. "We've demonstrated that the cost reduces to about $3.50 per hour for cost and maintenance," Wellington says.

The robot is equipped with both a television camera and microphones so that it can constantly transmit a video picture back to a guard stationed in a central control room. Also, it is outfitted with a microwave device that transmits its status every 20 seconds so that if an intruder were to tamper with it, the guard would know immediately.

The company, which struck research agreements with Carnegie-Mellon University, the University of Massachusetts at Amherst and Westinghouse Electric Corp., has incorporated the latest in robotics technology. The robot is equipped with 24 ultrasonic devices for object avoidance. In its computer memory, the robot is programmed with a map of its target area so that it can get a general picture of its course.

Even with careful computer programming, the inventors have run into the problem of dead reckoning. Without a perfect fix as to where it is, the robot can only use speed and direction to determine its location. Inevitably, its course will shift slightly and eventually will throw the unit off completely. To counter that problem, Denning has incorporated an infrared beacon sensor which, as the robot intersects the beacon, periodically lets the robot correct its course.

Denning President John Harding with the company's mobile robot.

According to Wellington, the next generation of the machine will include a sophisticated computer mapping device that will allow the robot's memory to be programmed with a profile of the room, and thereafter, it will know exactly where it is by matching what it sees with the image in memory.

Wellington says he does not foresee complete replacement of human security guards with robots. He insists that most security posts require humans but that approximately 10% of the jobs could be filled by robots.

In fact, Denning is counting on the robot to replace humans in either dangerous positions or those stuck in routine patrol jobs. Although robots as guards conjure up images of battles between humans and androids, the security robots are not geared to fighting off intruders.

Nonetheless, interest in the Denning robot has spread to the prison industry. Wellington explains, "With a robot patrolling an area, it might create a safer environment for inmates who fear prisoner-to-prisoner violence." ■

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Update

ROBOT from UPDATE/8

ogy. Beyond workers' fears about job security, management itself often provides the biggest obstacle. Factory floor managers tend to be partial to the methods they have used successfully for decades, and management is likely to issue the dictum, "If it's not broken, don't fix it."

Robots are also expensive. Individual models range from $25,000 to $150,000 and more. Cost justification can require great foresight on the part of corporate management. For example, Unimation estimates that human labor in the automotive industry averages about $15 per hour, while a Unimation robot, amortized over eight years, would cost approximately $4 to $6 per hour to work on the same assembly line.

Perhaps the greatest stumbling block for introducing robots has been a general lack of advance preparation by most neophyte users. Peter Cohen, an industry analyst with the International Data Corp. (IDC) in Framingham, Mass., points out that robots are simply a small part of the whole picture of industrial automation. Though the robots get most of the attention, a company should be well along its automation plan before attempting to make a major commitment to robotics, Cohen says.

Jeff Lebow, a manufacturing engineer with a major electronics company in Atlanta, agrees. "There are lots of misconceptions about robots," Lebow states. "The typical manufacturing engineer doesn't understand enough about robots to apply them successfully, and top management expects a one- or two-year payback when [robotics] simply has to take more time than that to pay for itself.

"There are simply not enough experienced people out there to apply robotics successfully," he continues. "People must plan for industrial automation. I've seen people ready to spend $8 million on factory automation, but they wouldn't spend $20,000 for up-front planning. This is not so much a technical problem as a people problem." Lebow's firm is just beginning to bring in robotics for a variety of applications. Unlike the situation in automotive plants, there is little need for welding.

Assembly applications, such as inserting components on circuit boards, and material handling applications, such as palletizing, are more common in the electronics industry.

Among the early obstacles Lebow encountered was the lack of robot speed. Currently, a robot moving materials through electronic testing simply cannot keep up with the speed of the testing equipment. The firm recently purchased an Adept Technology, Inc. four-axis robot — reputed to be the fastest in the industry — to address the problem.

Lebow believes senior management in companies must spend time and money to learn about robots and understand that they are just a part of the total system. "Robots tend to be the most reliable piece of equipment in the system," he says. Again, the key to success is designing factory automation before you bring in the equipment, Lebow insists.

By careful design of the work cell, benefits will come now and in the future. Without careful planning, the retrofit costs can be extremely high, and initial benefits will be lost.

Last fall, X-Marks' Bruckner saw a welding demonstration by a GMF robot. Though the demo wasn't particularly good, Bruckner knew immediately the robot could help him. He convinced GMF to install the robot for 60 days and then let his nephew and systems manager, Richard Bruckner, along with his welders, play with the unit. They were unanimous in their praise of the machine. The key to success was the need for precision fixturing. Without that need, the robot couldn't cost-justify itself. With the aid of GMF personnel, Bruckner programmed the robot to an accuracy of 1/5,000th of an inch in spot welding.

'I've seen people ready to spend $8 million on factory automation, but they wouldn't spend $20,000 for up-front planning.'

The welders at X-Mark were ecstatic at being relieved of a boring job, and Bruckner quickly noted that even with time spent on fixturing and programming, the job was still completed in half the time. Side benefits also popped up. A job requiring 21 ½-in. welds usually received 1-in. welds when a human welder performed the task. The increased accuracy of the robot saves on material costs, and welding tips last longer.

With three workstations already in use, Bruckner has plans for further applications. He is taking a close look at vision systems, and as his business increases, so will his venture into high technology.

Despite his success, Bruckner cautions that a company would be wise to bring along these new systems slowly. "You don't want to load down your people before they are comfortable with the machine," he says.

Though management at Snapper Power Tools was far less enthusiastic about its robot expenditures, Fife already has demonstrated that the new robot is worth its cost. Brought in for arc wire welding, the robot works a straight eight-hour day and will be doubling that schedule soon. It is 10% to 15% more efficient in cycle time and at least 50% more efficient in terms of quality.

"Once the parameters are set in the system, it takes away the possibility of operator error," Fife explains. "The robot follows a control path, and there is no wasted motion." His six-axis GMF Robotics machine is a double-ended machine that can hold four parts while another four are being welded. The arm flip-flops 180 degrees and features 360-degree rotation capability for applications.

The machine began to pay for itself immediately. It is being overseen by a former jig loader who has a lower pay classification than the welder he replaced.

Fife points out that as the first robot installed, the new machine presents a "tremendous learning curve in procuring and maintaining the system." Since he has pushed the company to automate in a number of areas, the robot has become just another tool "we must learn how to use."

While he has been frustrated by the difficulty in getting others to understand the potential impact of automation, Fife has been surprised at the enthusiasm with which the workers greet the new technology.

"People were hearing that we were not competitive, and they're happy to have a tool that will let us do our jobs better. This is a small-town company, and people who work here work here for life. They take pride in it."

Programming the robot once it was installed offered the greatest challenge. The contract called for the vendor to write the necessary program control software, but it was up to Fife to set the parameters and functions. He did the final programming himself.

"You learn something new everyday," he says.

At the leading edge

While corporate America decides whether or not to accept robotics, an array of leading-edge research and development continues at robotics laboratories on campuses and in private industrial research centers. Without the pressures and constraints of product development hanging over their heads, robotics researchers have taken the discipline yards closer to the science fiction models that have intrigued the public for decades.

As projects attempting to create robots that can see, feel and even think have gotten under way in diverse locations, a common obstacle has emerged for researchers: the task is tough. The public, weaned on a diet of *Star Wars* and pulp science fiction, assumes that machine vision and tactile sensing are commonplace. Any day now, walking and talking robots will be doing the vacuuming and taking out the garbage.

Unfortunately, both the scientific and economic realities are that those days are still far off. MIT's Lozano-Perez points out that in the area of robot manipulation, for example, research has only shown how far there is to go.

"The problem of creating robot

See **ROBOT** UPDATE/12

A Brief History of Robots

Pre-1900: A long list of religious and literary figures, such as Mary Shelley's Frankenstein, depict beings created in the image of humans.

1923: Karel Capek, Czech playwrite, coins the term *robot* (which means serf or worker in Czech) in his play *RUR* which stood for Rossum's Universal Robots.

1927: Fritz Lang's film *Metropolis* unveils a futuristic female robot named Maria.

1939: Westinghouse displays Electro, a robot man, and Sparko, a robot dog, at the 1939 World's Fair.

1941: Author Isaac Asimov publishes the first of his *I, Robot* stories, which introduce what becomes the classic popular science fiction robot.

1954: George Devol files with the U.S. patent office for his "programmed article transfer" device, the first pick-and-place industrial robot.

1959: A prototype Unimate robot, built by Consolidated Controls, is installed at General Motors Corp.

1960: Stanford Research Institute develops "Shaky Robot," a mobile, advanced android robot on three wheels, with built-in logic systems, TV camera and range finder.

1962: Unimation, the first industrial robot company, is founded by Joseph F. Engelberger.

1969: The first spot-welding robots are installed at GM plant in Lordstown, Ohio.

1977: *Star Wars*, which introduces an updated and intensely popular vision of robots, makes its debut in U.S. theaters.

1980: First vision-aided robots introduced.

1927: Fritz Lang's film *Metropolis*

COURTESY OF ACADEMY OF ARTS AND SCIENCES

1977: *Star Wars*

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Partial source: Westinghouse Robotics Handbook

Update

Robots in Japan pose another challenge to U.S. industry

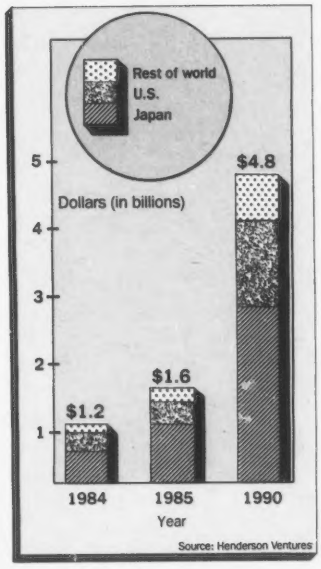
By Earl C. Joseph
Special to CW

In the early days of robotics, Japan trailed the U.S. in installation, application and production of industrial robots — but not for long. The Japanese now lead in all three respects. Why have they taken to robots while Western countries have considered them as an affliction for nearly 20 years?

One likely answer goes back to the late 1960s and the concern of impending labor shortages. The Japanese Ministry of Labor projected half as much growth (0.7% rather than 1.4%) in labor supply for the 1970s than was needed to sustain 9% annual economic growth. By 1977, Japan expected to be more than three million workers short. The theme of a Japanese robotics symposium in 1967 was, "What can the robot do for a society that is short of labor?"

WORLDWIDE PRODUCTION OF ROBOTS BY VALUE

MITCHELL J. HAYES



Japanese policy makers reacted with vigor to the projected labor shortage by encouraging the start-up and growth of small businesses in the robotics field. In 1971, Japan established the Industrial Robot Roundtable, the first of its kind in the world, predating the Robot Institute of America by three years. In 1972, the roundtable was reorganized into the Japan Industrial Robot Association (Jira).

In its second year, Jira was converted to a private association under the Ministry of International Trade and Industry (Miti). Jira's efforts go far beyond those of typical American trade associations, especially in supplying millions of dollars of interest-free loans to robot vendors and users.

Joseph is a futurist and president of Anticipatory Sciences, Inc. in Minneapolis.

The Japanese government has also fostered the production and use of robots. Early in the 1980s, firms installing robots were given a depreciation allowance plus an additional 13%. Below-market interest rate loans were available to purchase robots. Miti in 1980 established the Japan Robot Leasing Co., initially subsidized by 24 robot manufacturers and 10 insurance companies and backed by a loan syndicate that includes the government's Japan Development Bank, the Long-Term Credit Bank and the Industrial Bank of Japan.

By the late 1970s, a dozen Japanese government laboratories were engaged in robot research, some funded under the umbrella of the large-scale research projects group coordinated by Miti's Agency for Industrial Science and Technology. One project's goal was to design by 1980 an unmanned machine production plant. In 1977, another project was aimed at developing a flexible manufacturing system using lasers. In 1983, the agency initiated a project to produce intelligent robots within seven years.

Throughout this period, the American scene was quite different. U.S. economists projected a surplus of labor, not a shortage. Government, union and industrial policymakers encouraged a slow move toward the robotization of American industry. Then the U.S. faced Japanese competition — lower price and higher quality — resulting, in part, from their use of robots. In 1983, more than half of the world's robots were found in the automobile industry, an area where the Japanese lead.

The macro- and microeconomic impact of high technology can be observed in the factory today as it is transformed by robots and computers into the factory of the future. For

See JAPAN UPDATE/16

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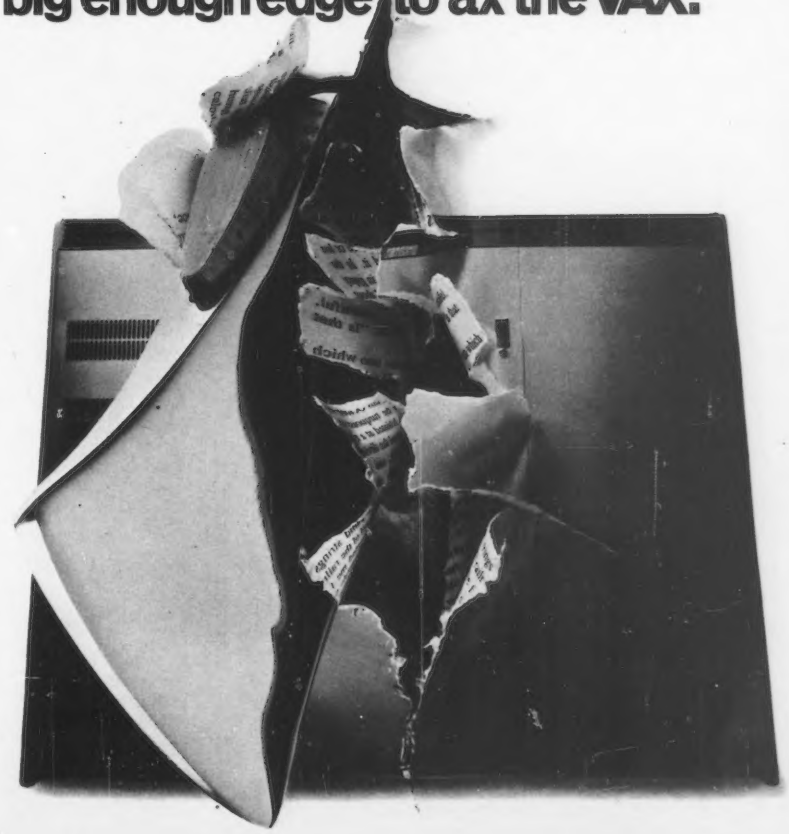
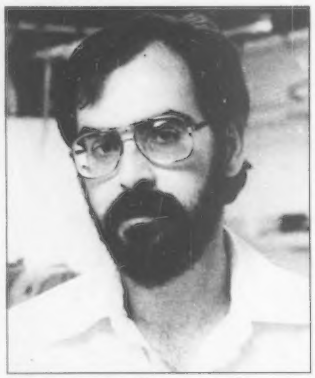


Update

ROBOT from UPDATE/10

hands is enormous," he says. "We don't know how to do it at all. It's orders of magnitude more complicated than we thought. Most of our brain is devoted to vision and manipulating the hand. The part of the brain devoted to language is minuscule compared with that. You had several billion years of evolution to get very good at seeing and moving your fingers.

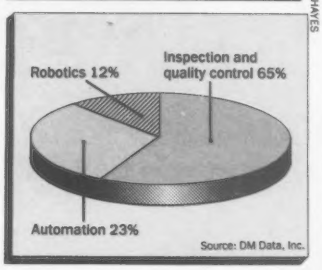


Tomas Lozano-Perez, associate professor in MIT's AI lab

"Robot grippers are designed for a single application. We are working on multiple-finger hands, and the basic problem of simply moving things around is amazingly difficult."

Michael of ADL believes that the role of advanced technology in robotics presents some critical questions for the industry. With many areas of development such as vision, sensory perception and feedback moving forward rapidly Michael wonders, "What is the appropriate role for that technology? Is it needed? How much is needed? Is the market willing to pay for it?" For universities, those questions are unimportant. Michael is concerned that without ready markets, all the advanced work might become mere bells and whistles.

MACHINE VISION APPLICATIONS



MITCHELL J. HAYES

At MIT, the AI lab, under the direction of Professor Patrick Winston, has done breakthrough research in numerous facets of artificial intelligence, expert systems, natural language, learning and robotics.

The major funding for the research comes from Defense grants and national research foundations.

Though there is support from private industry, MIT's work is considered pure research and is unencumbered by corporate expectations.

The robotics research, according to Lozano-Perez, falls into two main categories: vision and manipulation. There is also a single research project in mobile robots.

The vision research is broken into two parts: low-level and high-level vision. In low-level vision research, some of which has been used in commercial vision systems, the goal is to obtain depth representation by knowing how the intensity of light changes across an image.

The vision research also encompasses the use of motion and shading to obtain depth and shape information. "The human system makes use of all these techniques and more," Lozano-Perez says. "What we're trying to do is take the cues from biological vision and use them to obtain depth information. Of course, all this does is transform the amorphous information obtained through a camera into something that is usable. It makes no assumptions about recognition. You still don't know what's out there."

In high-level vision work, the aim is to provide somehow recognition of what is out there using geometric models. Most of this work extends into the sophisticated tracking systems required for military purposes, such as the autonomous land vehicle.

Commercial vision systems in use in robotics today are two-dimensional binary systems that convert images into black and white and then use lasers to scan the outline for object recognition. According to Lozano-Perez, people in industry would like to be able to use these vision systems for inspection, an application that in many cases will require three-dimensional data.

"For sophisticated projects like Darpa's, all the vision systems are based on 3-D," Lozano-Perez says. "Three-dimensional [technology] is perhaps the future. But people argue whether that has a place in factories where you know where things are and what they are."

Todd Simonds of Carnegie-Mellon University

He points out that most of the argument centers on the "bin-picking" problem. Many factories continue to store materials in large bins, and robots, as of now, cannot distinguish one item from another in those bins.

"Bin picking can be done now for simple parts, but for complicated parts, it is a difficult problem, and people wonder whether it is economically viable," he states.

Lozano-Perez cautions that those counting on sophisticated vision systems for robots may wait a long time. "Two-dimensional vision technology took 15 years to develop," he explains. "It is an extremely old technology which became practical with the advent of microprocessors. It's possible that it will be another 15 years or more before we get to the next generation," he maintains.

In the area of manipulation, MIT supports several major projects, including the joint effort with the University of Utah's Center for Biomedical Design known as the Utah/MIT hand. After four years of research, the project teams delivered a prototype hand with four fingers operated by eight tendons. Each finger on the prototype hand is controlled by a Motorola, Inc. micro-

See **ROBOT** page 14

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Update

Off-line programming: The next big step in robot technology

By Ben Nagler
Special to CW

Substantial reductions in robot programming time, elimination of the need to stop production while programming and the ability to generate more complex, more efficient programs are reasons why the off-line programming of robots is improving the bottom line — now — across a spectrum of industries.

What is off-line programming? What is its significance for computer professionals outside the manufacturing department?

Since the beginning of industrial robotics some 25 years ago, robots have been programmed by the "lead-through-teach" method whereby the operator, using either an attachable teach pendant with a keyboard and function keys or the control console, leads the robot through the intended motions. The motions are recorded on either floppy disks or tape and then played back. The tapes or disks can be replicated for other robots with identical tasks. Typically, robots can store a limited number of programs internally and then switch back and forth between programs to meet production demands. In some cases, programs can be automatically "mirror imaged" for right-handed or left-handed tasks, as with car bodies.

Starting from square one is likely to be very expensive. In some industries, computerized off-line programming is not yet feasible or cost-effective.

The principal limitation to this programming technique is that the robot and its associated equipment — usually two to four times the value of the robot itself — are all tied up while the robot is programmed. More often than not, multiple passes are needed to edit out the bugs. Further, many plants — especially in the automotive industry — employ dozens or even hundreds of robots, with no two doing identical tasks. On-line programming is clearly time consuming, and the necessary skilled personnel are in short supply.

When plants started to buy robots for use as emergency spares or for research and development or personnel training, they also began to use these robots for off-line programming when they were identical to those on the production line. Such use of extra robots for off-line programming is still common today and will probably continue for the near term, but it's not the latest technology.

The latest technology is completely computer based. The programmer, sitting at a remote terminal, preprograms the robot's movements just as effectively as with on-line programming.

From the standpoint of computer technology, the programmer creates files, the formats and contents of which closely resemble those created on-line.

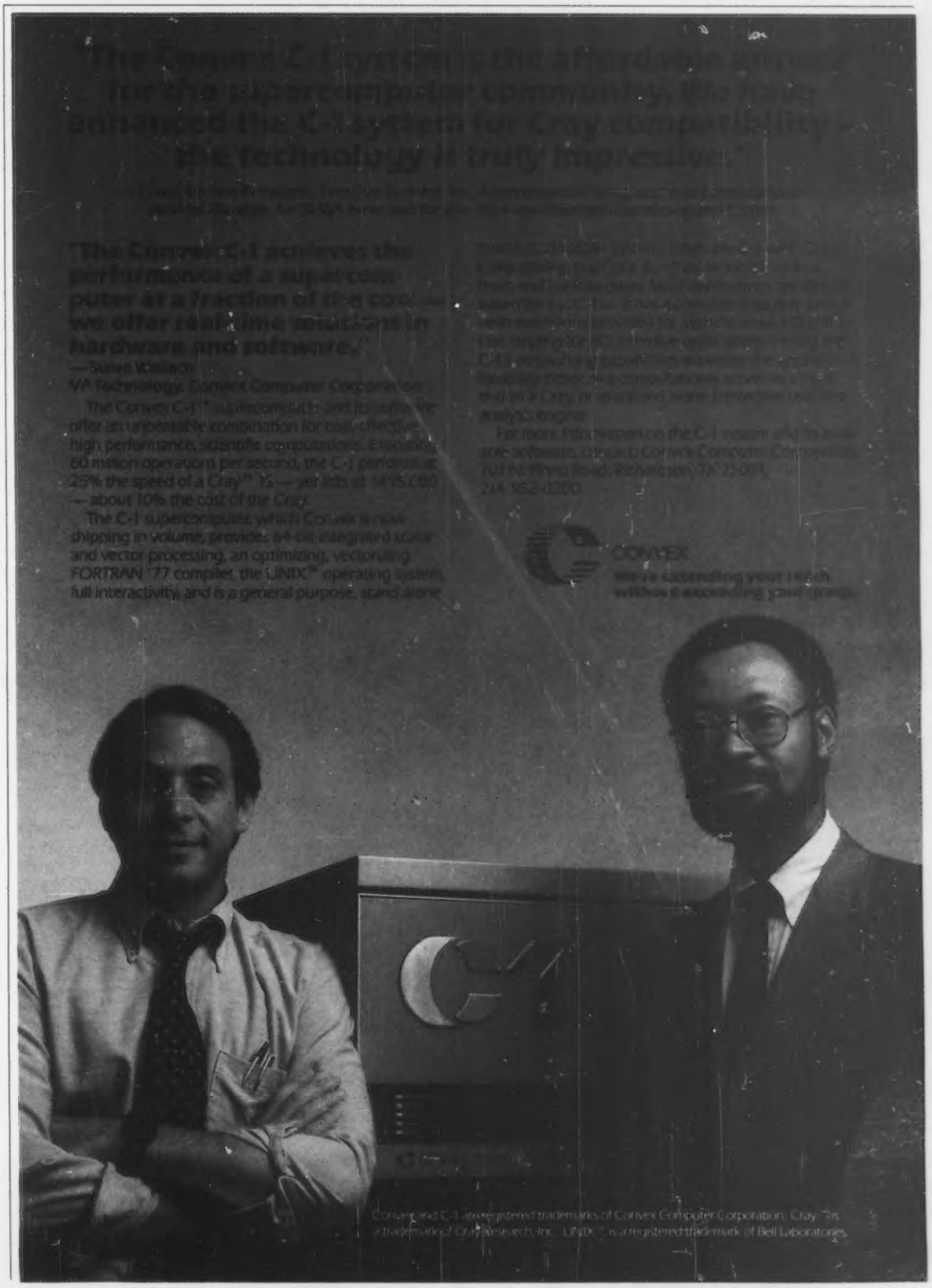
Before further discussing current trends, some perspective will be helpful.

Computer-based off-line programming requires a realistic model of the workpiece and manufacturing process and is feasible and cost-effective only if the bulk of the data needed is already captured in a computer-aided design and manufacturing system. The CAD data base operation is, relatively, easier to acquire — from drawings, for example; the process or CAM data that may be needed is generally quite difficult to capture in a suitable form.

In assembling a mechanical device, for example, the transfer and insertion of a subassembly into a larger assembly may have to be constrained so that internal components don't fall out or get damaged in the process. Additionally, the incorporation of vision or touch sensing in a process to identify a part, verify its quality or confirm that two pieces have been mated properly may be desirable. The important point is that starting from square one is likely to be very expensive. In some industries, notably spray finishing, computerized off-line programming is not yet feasible and/or cost-effective.

Technological change occurs only when there is some driving force behind it. The principal force behind all aspects of factory automation has been the automotive industry — especially General Motors Corp. The entire industry has invested heavily

See **CAD** UPDATE/16



Nagler is a Cleveland-based freelance writer specializing in high-technology topics.

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ROBOT from UPDATE/12

processor, and a Digital Equipment Corp. VAX-11/750 handles high-level planning and control. The hand performs roughly like a human hand.

Other MIT researchers work on the Stanford/JPL/MIT three-fingered hand, a project concerned with the design, control and programming of articulated hands as a means of increasing robot dexterity and adaptibility.

As these devices become more sophisticated, MIT researchers, including Lozano-Perez, are working on incorporating "planning" into them. Currently, every movement and task must be laboriously programmed into the hand. Linking them up with AI, the goal is to get the robot to program itself.

This problem is not easily solved. Lozano-Perez has worked on planning motions for 10 years and only now is making minimal progress. "Something as simple as getting the robot to find the shortest path between two points without hitting a set of obstacles turns out to be provably intractable," he says. "You can't even express the answer completely."

At Carnegie-Mellon, the mandate of the Robotics Institute is far more pragmatic than at MIT. Fully two-thirds of its funding comes from private industry, while the remainder is from government grants. Though not particularly end-product oriented as an industrial research lab might be, the Robotics Institute has focused mainly on bringing robotic technologies to bear on one or another set of manufacturing problems, according to Associate Director J. Todd Simonds.

The institute, with $9 million in funding, is broken into 14 labs concentrating on everything from vision systems to the social impacts of robots. In the manufacturing lab, researchers work on developing robotic- and computer-numerically controlled techniques along with a special language called CML to achieve a truly autonomous manufacturing-cell operation.

Another lab is focusing on improving controls of welding robots using sensors that will enable the robot to follow precisely seams that deviate from the original design.

"Until now, a welding robot has been useful only for long runs in a set place," Simonds says. "But a lot of welding in American manufacturing is short-run or even custom welding. With this research, we expect over the next few years to use welding robots to carry out custom work as well."

Toward that end, the institute is also working with expert systems. The goal is to capture the expertise of skilled machinists or welders and program it into robotic systems.

In the vision area, work is being done on visually based adaptive control: showing the robot an image of its hand around an object and instructing it to remember that image and be able to extract other images from it. Currently, when a robot is programmed, it must start with a blank slate. The goal here is to give the robot the ability to teach itself in a way that humans do.

Work is also on-going in civil and construction engineering using AI techniques. Development is under way on an excavator robot for the gas pipeline industry that will excavate around leaking gas lines. "This is extremely hazardous work for a human," Simonds points out. "There is a 10% mortality rate."

Using similar technology, the institute developed a set of robots that are operating at Three Mile Island in the cleanup operation. The robots were designed specifically for this task because it was simply too radioactive down there for a human "to even open the door," Simonds says.

Off campus, at AT&T Bell Laboratories in Holmdel, N.J., John Jarvis leads his robot systems research department in four main categories of research: computer vision, sensors, multiple processor systems for robot control and robot control algorithms.

Though AT&T offers no robot products for sale, Bell Labs' motivation is taken from manufacturing-related problems. Nonetheless, the research is pure, according to Jarvis, and the work is concerned only with the search for concepts.

The biggest success story thus far comes in the area of hand-eye coordination — finding a real-time vision system with real-time robot controllers, Jarvis says. One project developed a vision system that can track objects at a rate of 60 times per second. It can direct the robot to pick up moving objects.

Jarvis is optimistic that in the next five to 10 years, practical tactile sensors will combine reasonable cost and performance along with reliability and computing systems necessary to be integrated into the work cell.

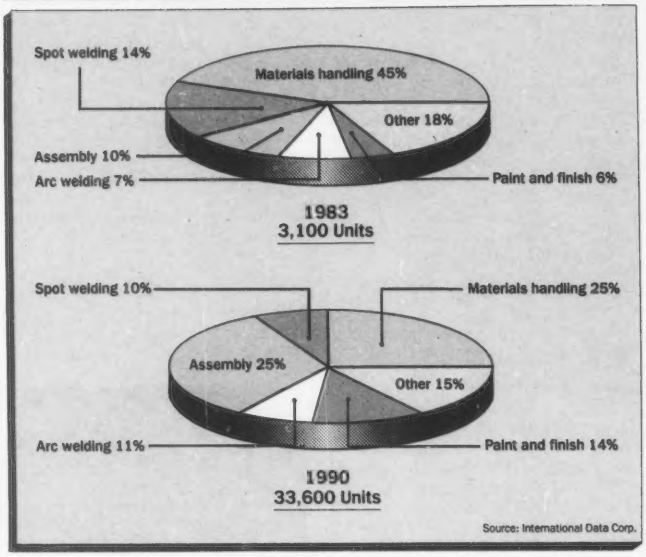
Though he agrees that the cost of implementing these systems is prohibitive, Jarvis believes the biggest obstacles to implementation of advanced systems may be as much administrative and cultural as they are technical.

"It's an educational problem," he points out. "A lot of people in factories need to have a better understanding of these types of systems. Sometimes the amount of programs and understanding of those programs necessary to use them is very high and difficult to use in a factory environment."

The driving force behind any realistic attempt at the ultimate work cell will require increased magnitudes of computer power, Jarvis says. "Since I've been involved with this work, we've had several orders of magnitude increase per dollar in computer power, and we seem to be nowhere nearer to what we need than when we started," he says.

MITCHELL J. HAYES

U.S. ROBOT APPLICATIONS, 1983/1990



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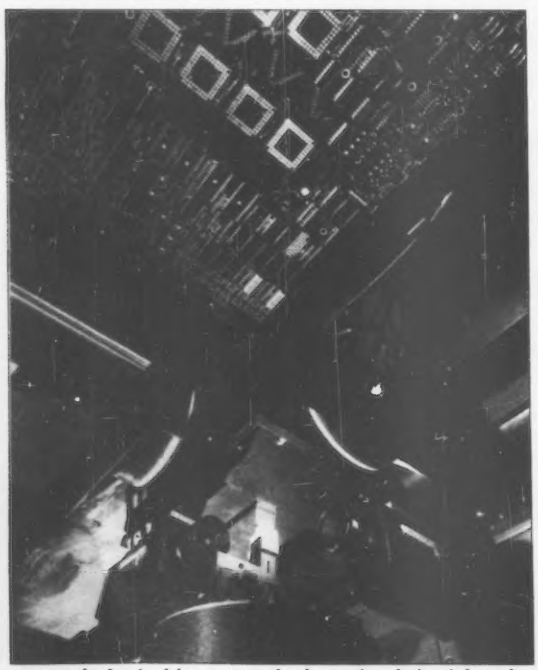

Automatix, Inc.'s vision system checks a printed-circuit board.

The robot makers

The robot manufacturers, with the exception of GMF Robotics, are having a tough time figuring out how to turn a profit. Trying to remain at the leading edge of the technology is an added worry.

Companies such as IBM or those with access to well-stocked parents such as GM and Westinghouse clearly hold an edge. Westinghouse, for example, provides Unimation with not only a potent working laboratory for its machines, but it supports a great deal of research in the area of robotics. It was among the first and largest supporter of Carnegie Mellon's Robotics Institute, and the company maintains its own R&D center for robotics research.

Westinghouse is working on sensor and vision systems, software architecture and systems, mechanical and servo-drive systems, robot and work-cell control systems using multimicroprocessors, smart vehicle systems and computer-integrated engineering.

Meanwhile, Unimation actively seeks new markets for its robots. According to Bloch, the company is exploring such offbeat opportunities as meat cutting and fish filleting, wedding cake decorating and packing speciality foods.

American Robot has made investment agreements with both Ford and BMW. With their support, the company is working on vision systems for inspection and robot guidance as well as in the area of computer-integrated manufacturing. "It's not just a financial partnership, it's an industry partnership in which they are getting our technology, and we get their understanding of the problems that need to be solved," Gilbert explains.

Like Jarvis at Bell Labs, Gilbert is convinced that more computer power is necessary to create truly outstanding robots. "I could create a system today that would knock your socks off, but I would need a VAX or even a [Cray Research, Inc. system] to do it," he says.

Gilbert also expects to see much accomplished with expert systems. It takes years, he notes, for a master welder to learn his craft. Welders using robots tell him that it takes up to two years to understand just what the system can and cannot do.

At GMF Robotics, applied research focuses on several areas, the most significant of which is off-line programming. According to Cohen of IDC, off-line programming is currently an extremely limited part of the marketplace with only 50 installations in that mode. Most observers agree, however, that off-line programming will be a key feature in years to come.

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According to Johnson, GMF has pioneered off-line programming in robotics. A complex and costly endeavor, GMF is attempting to bring off-line programming down to the personal computer level as well as to 32-bit workstations and computer-aided design and manufacturing systems. "This is an area that will help our users apply their robots more easily," Johnson states. "If you can reduce the time it takes to program the robot to do the job, you have greatly decreased the cost of any system."

Robots and the DP/MIS staff

The move toward fully integrated industrial automation systems with increased off-line programming could significantly affect the data center.

GMF's Johnson says that data processing will certainly be affected as more programmers are needed to write programs for flexible automation tasks. "This area is going to be explosive," he says. "It's a good time to be in DP, especially if you have an industrial background."

IBM's Klein believes that the involvement of DP/MIS personnel with robotics varies from company to company, depending on how complex the industrial automation network has become. "In a company integrating all the manufacturing and communication of data on the plant floor and where local-area networks have created the need to exchange information back to key departments such as engineering systems or material requirement control systems, there is significant involvement of DP," Klein says. "In other companies, the MIS executive has very little to do with manufacturing, and those decisions are generally left to the plant manager."

ADL's Michael sees a significant DP/MIS role in robotics. "It's inevitable that they will get involved," he declares. Michael foresees a computer hierarchy with the lowest level being a programmable controller that is embedded in a robot going up to supervisory cell controller, area controller, plant controller and on up to the corporate computer.

"The greatest detail I've seen of this hierarchy is seven or eight levels, and certainly once you are at the corporate computer, you're at the MIS level," he says.

MIS will almost certainly get involved in the linkups of networks and the creation of data bases that will inevitably include engineering and manufacturing data as well as typical corporate data.

"I don't think MIS people need to be concerned with robots so much as the emerging networking aspects of factory automation such as MAP," Michael says. "When local-area networks extend from the factory floor to the office network, they'll have to be involved."

A look at the future

"The factory," says Lozano-Perez, "is not a very receptive environment for the more advanced functions."

In that light, robotics researchers agree that robots of the future may find the most technically challenging environments outside of industrial automation. Applications within the space program and in the military will lead to the greatest advancements, calling upon robots with the most humanly evolved characteristics.

Robotics researchers agree that robots of the future may find the most technically challenging environments outside of industrial automation. Applications within the space program and in the military will lead to the greatest advancements, calling upon robots with the most humanly evolved characteristics.

"Robotics is moving rapidly out of the factory," adds Simonds of Carnegie-Mellon. "Of our $9 million in grants, $3 million is in nonmanufacturing work, such as the autonomous land vehicles. I have every reason to believe that by the end of this decade there will be autonomous vehicles operating — with lots of legal constraints — on the open road. We have them operating on the sidewalks of Carnegie-Mellon right now.

"I expect to see gracefully mobile leg devices that can move up flights of stairs or across rocky terrain. I expect to see robots playing Ping-Pong. In fact, that's already a club-level activity on our campus."

Most industry watchers agree that a single breakthrough is not imminent in robotics. It will be a slow, evolutionary process dictated mostly by the decreasing cost of computer power.

Lozano-Perez sees no fundamental limitations to robots with capabilities once reserved for science fiction. He does note, however, that the most basic physical advances could be 20 years away; as for intelligence, there is simply no way to predict what will happen. "Lately, what's happened in AI is that people have found applications for very simple things. But there haven't been any break-

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throughs in the fundamental reasoning processes involved. That's still out of reach," he says.

George Devol, considered the founding father of robotics for having patented the first pick-and-place robot in 1954, proposes a most farsighted idea for the future. He is promoting the idea of a completely automated manufacturing facility that would be leased to medium-size businesses in need of robotics and factory automation.

"There's a tremendous need for medium-size manufacturing to take advantage of robots," Devol says. "We already have 85% of the technology available to do this, and the other 15% is strictly programming and networking issues. The biggest stumbling block is that it costs $100 million to get started."

Gilbert, of American Robot, believes that the truly impressive systems for industrial robots will emerge in the mid-1990s. "There will be thousands of robots out there between now and then. But I believe the impressive, flexible systems are going to come later, and that's what most of the players in the marketplace are looking for right now."

As for the more current robotics industry picture, analysts such as Conigliaro feel that brighter days are coming either next year or in 1987. She predicts 25% to 30% growth annually for at least the next three years and profitability coming to more than a handful of companies. In addition, she predicts that the shakeout and consolidation period will come to a close, and those companies with a serious shot at the market will remain, while a host of others will give up in defeat. What she definitely does not expect are any more start-ups in the field.

"Experience is a very important barrier to entry into this industry," she says. "Experience means a lot — there's no substitute for it." ■

JAPAN from UPDATE/11

example, in 1984 the average age of industrial equipment in the U.S. was younger than the equipment in Japanese industrial plants by about three months.

This leapfrog over the Japanese by the U.S. came to light in a study reported in *Nihon Keizai Shimbun*, a Japanese business journal. For years, U.S. factory equipment was older than that of the Japanese; now the tables are turning.

This leap forward is primarily caused by the expanded capital investments in high-tech factory automation made in the U.S. in 1983, especially in the automotive industry.

The average age of U.S. industrial equipment dropped during this period from about 7¼ years of age in 1983 to less than 5½ in 1984; Japanese industrial equipment aged by 11%.

General Motors Corp., for example, invested $20 billion in capital improvements of its industrial equipment from 1981 through 1983.

High-tech investments in robots, computers, computer-aided design and manufacturing, flexible manufacturing systems and other automated factory machines and software were key to this turnaround of U.S. industry.

However, this country is still lagging in steel and many other areas. And Japan's high-tech industries are being given massive government doses of rejuvenating capital.

Japan's 150 robot makers are struggling to compete with leaders in the U.S. and Europe. Japanese industry can be expected to give birth to a new generation of robots in hope of becoming the leading nation not only in using robots but also in supplying them to the world.

These third-generation robots are expected to be smarter (more on-board and embedded computers), to incorporate voice and speech recognition and to possess sight and a high degree of sensory and touching capability. In some cases the robots will be more mobile, some with walking capabilities.

Third-generation robots will be aware of their environment and will react to it as they sense it instead of being second-generation "dumb" repeaters of a series of programmed motions.

First-generation robots, the majority of the ones used in Japan, are merely automated mechanical arms with grippers that indefinitely repeat programmed operations.

Second-generation robots are more versatile. Nevertheless, in 1983, Japan had almost 17,000 of the world's 40,000 second-generation robots in use.

The Japanese robot industry differs markedly from its U.S. counterpart. Virtually all U.S. robot production comes from just a few firms like GMF Robotics, Inc. and Unimation, Inc. In Japan, there is considerably more diversity both in number and types of robot manufacturers. Of the 150 Japanese robot manufacturers in 1983, Kawasaki Heavy Industries, Ltd. captured only 8% of the market. The company leads only in spot-welding robots.

U.S. robot manufacturers concentrate on general-purpose robots; the Japanese tend to develop special-purpose robots, often for their own use. These differences have far-ranging implications.

The Japanese challenge is clear: They have geared up to dominate this strategic new industry. This dominance in recent years is feeding the competitive strength of a growing group of other Japanese industries. The main question facing the U.S. robotics industry is whether it can stem the tide. ■

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CAD from UPDATE/13

in putting all its body and component designs into CAD data bases. In addition to its own significant purchases, the industry is forcing its suppliers to improve manufacturing technology. For manufacturers dependent on the automotive industry, high technology is becoming more a matter of survival in a very tough, competitive environment.

A corollary effort within GM appears also to have had an impact: Electronic Data Services Corp. (EDS) has been assigned the task of getting GM's computers in manufacturing operations to communicate with its financial computers.

Another group in the forefront of applying CAD-based off-line programming is the printed-circuit board industry. To be competitive, the manufacturers must lay out their artwork on a CAD system — which means that the position of every component and hole is known.

With the latest surface-mount technology, standard components are placed on boards with high-speed, dedicated machines, but robots are needed to place outsize or nonstandard components. With the CAD data base, these can easily be preprogrammed off-line.

Off-line trends

A number of trends in technology are apparent, and each broadens the technology's applicability.

■ Software is shifting from "how to do it" to "what to do" statements; software is becoming data driven instead of program driven. This shift has occurred because users want to have more commonality from one installation to another.

Also, vendors fighting high applications software costs want to reduce their costs per installation. In a sense, a data base and its applications characterize a manufacturing process. Thus, this trend underscores the need for and the benefits of well-designed data bases. Without a suitable data base, data-driven software would not be feasible.

■ Programming languages are becoming more general purpose — becoming, on the one hand, more device independent and environment independent (portable) and being applied to controlling processes as well as robot arms.

Robots are not expected to send statistical production and quality reports to a host. At the same time, the capabilities of the host computers are being enhanced by being applied to larger spans of control.

Clearly, these enhanced robot and host capabilites also improve the ability of the plant management to know what's going on and to integrate all operations further — but only to the extent that internodal communications and information storage are also brought up. Robotic cells may now need megabytes of associated memory instead of kilobytes — a requirement that has created some problems:

■ Where should the data be stored — in the robot or at a remote computer?

■ How does one ensure the integrity of the information? How should it be backed up?

Right now, there is no consensus on the solutions. Conceivably, something may come out of GM's Manufacturing Automation Protocol (MAP) program. Again, this relates to the significant role GM is playing in rationalizing all areas of U.S. manufacturing automation technology.

For years, robot and other automation equipment users have been plagued by difficulties in getting different vendors' equipment to communicate with each other.

About two years ago, GM decided to muster the full weight of its economic clout and essentially coerce key automation equipment vendors into adopting a single MAP.

Automation heavyweights like IBM and Allen-Bradley Co. are now engaged in cooperative discussions.

Given the need for the availability of a CAD data base, it is not surprising that complementary software for laying out and simulating cell operations on graphics terminals has also been developed. Indeed, the combination of these capabilities with off-line programming has proved to be a powerful tool.

Finally, a word about "people problems," which have been a major drag on the rate of factory automation. The ultimate goal of a completely computer-integrated manufacturing enterprise can be reached only if all parties concerned talk to and understand each other. (EDS personnel at GM are important participants in factory automation discussions.)

For nonengineering data processing professionals, help in understanding high-technology manufacturing technology is available. The Society of Manufacturing Engineers in Dearborn, Mich., offers courses or seminars geared to the interests of DP personnel.

A shortage of trained personnel to implement all aspects of high-technology manufacturing has been a persistent problem and will probably continue for the near future. ■

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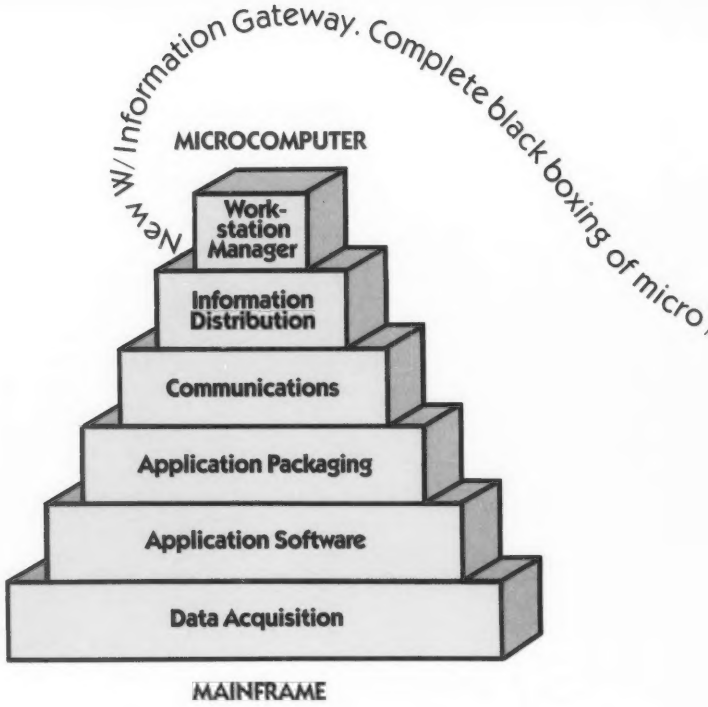

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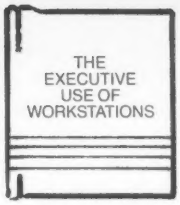

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IN DEPTH

The back-to-school training blues

ILLUSTRATION BY JON MCINTOSH

By Gary Slaughter and Joanne Fletcher Slaughter

Admitting they need training in fundamental people skills is abhorrent to most DP managers. Shouldn't they already be effective managers after 15 or 20 years of experience?

We should be extremely pessimistic about the chances of any DP department implementing a full and effective management training program. The current state of affairs of the two people who would launch such a program — the top DP manager and the DP trainer — dictate this pessimism.

Traditionally, DP trainers spend most of their time on technical training for DP departments, because organizations value technical prowess. Lately, emphasis has shifted back toward managerial skills. Organizations place greater value on DP professionals' ability to interact successfully with each other and with top management, so the DP trainer's job description has effectively changed.

The trainer's new task may not be an easy one. Management training is the most difficult area of personal skill training for DP managers. Hard to evaluate or quantify, management training may be even harder to sell to DP managers.

Typically, top DP managers are the training have-nots of the DP department. They receive fewer days of training each year than any other DP group except operations and data entry. Whether they admit it or not, DP managers often lack the essential "Three Ps" — people skills, public relations skills and political skills — for successful interaction with top corporate and end-user managers or even with their own staff members.

More often than not, top DP managers are overworked, stressed and burned out. They feel undervalued by their superiors and their peers. In effect, they operate under siege from top and end-user management, from vendors and from their own subordinates. As a result, many are skeptical to the point where suggestions for helping them out of their situation are met with suspicion.

Perhaps most important, to many experienced DP managers, the idea that they need training in fundamental people and management skills is abhorrent. After all, don't their resumes say they possess all those skills? Shouldn't they already be effective managers after 15 or 20 years of management experience?

This "resume resistance" by some top DP managers is so strong that they refuse to attend management development training sessions that they arrange for their subordinate managers. Needless to say, their boycott neither strengthens their skills, improves relations with subordinates nor offers support for the spurned DP trainer.

As a rule, the DP training director still faces an uphill battle to win the commitment and involvement of top DP management. Despite years of struggle to establish the value of DP training programs, on average, according to the 1985 Brandon Systems Institute (BSI) annual survey, DP training budgets make up a shrinking percentage of the overall DP budget.

Despite the odds

One reason is that DP training still suffers from a serious image problem. Other DP professionals tend to view DP trainers as glorified clerks who, because they are not capable of doing anything important or responsible, are put in charge of training. This lack of recognition is demonstrated by the fact that only one-third of DP training directors report directly to the top DP manager. The rest are buried somewhere in the organization, out of sight and out of mind.

There is another reason DP trainers lack the commitment of top management: Trainers are often among the least trained and informed on the subject of management development. Trainers themselves suffer from a lack of the Three P's, which seriously impairs their ability to sell top DP management on the need for management training.

The current state of both top DP management and DP training appears to suggest little hope for a surge of new management training programs. Yet, despite these odds, hundreds of DP organizations

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improper reason for optimism, but it is a cold fact that top DP management must change.

Top DP managers who lack the Three Ps needed to excel in today's environment cannot survive. The drive to decentralize computing power outward into the user departments would ordinarily be enough to dictate a need to improve.

However, this force has been joined by a growing awareness by top corporate and end-user management of the ever-increasing costs of DP service. This management recognizes that the increasing cost of DP staff is the most significant factor affecting increased DP cost in general. Hence, the pressure is on top DP managers and their subordinate managers to cultivate and protect the DP department's most valuable resource — its people.

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> *The pressure is on top DP managers and their subordinate managers to cultivate and protect the DP department's most valuable resource — its people.*

Also, a certain unrest within the DP department itself is pushing top DP managers to reevaluate traditional management styles and decision-making processes. Many younger DP professionals as well as their younger supervisors are simply not accepting management methods of the past.

These valuable — and expensive — members of the DP department are demanding a greater say in decisions that affect them and their jobs. They back their arguments by pointing to the recent successes of participative decision-making and team problem-solving methods popularized by the Quality Circle movement, the One-Minute Manager and other similar approaches.

The benefits of democratic management styles and team building are creating a new ethic in the DP profession. The ethic demands that "enlightened" DP managers must set aside old management ways and train themselves to adopt a people-oriented approach.

Ironically, this new ethic is creating a healthy competitive spirit in many top DP managers that motivates them to seek management development training. They want to be the first to have it. Old dyed-in-the-wool autocrats among DP managers are now claiming to have "invented" participative management.

Those of us who have been loudly recommending this change for a number of years say the change is taking place because of fatigue factor — we simply wore them down. Regardless of the reason, the emergence of this changing attitude in top DP managers is seen as a refreshing, encouraging and hopeful sign for the DP profession and for its future longevity.

DP training's future

In a sense, DP trainers have no choice but to change, like their top DP managers. The pressure on them, especially from DP middle management and first-line supervisors, to provide personal and management development grows daily. Fortunately, DP trainers are better equipped now to meet this need than ever before.

First, there is a growing resource base for training and support in the management development subject area. More and more vendors offer management skills training for DP professionals. In many cities, consortium groups pool requirements for DP management training to bring in high-quality training sessions at a reasonable cost to participating companies.

Training and development literature is now filled with good advice on how to design, develop and implement management development programs. In short, an overall awareness of the need for this training has created a larger source of supply for both training and information on training DP managers.

Second, consortium training and other forms of shared management skills training have given DP trainers the flexibility to offer schedule and location choices to top DP managers. Some top managers do not seem to mind "exposing their ignorance" to other top managers, but resist sharing workshop sessions with their own subordinate staff members.

Even though top management misses the opportunity to build trust and rapport with members of their own management teams by scheduling themselves for management training with strangers, they at least receive the training.

From the standpoint of professionalism, according to the latest BSI survey, DP training positions are being filled more and more by full-time, career DP training people. Partly as a result, turnover among DP trainers is significantly lower than it was five years ago. Furthermore, there are strong signs that DP training is coming of age and is shedding its bad image of the past. The recently acquired credibility of some DP trainers can be attributed directly to their taking a leading role in bringing management development training to their organizations.

As a result of their newly gained credibility, some DP trainers are now moving ahead in areas other than training. Their charters are broadening to include all elements of DP

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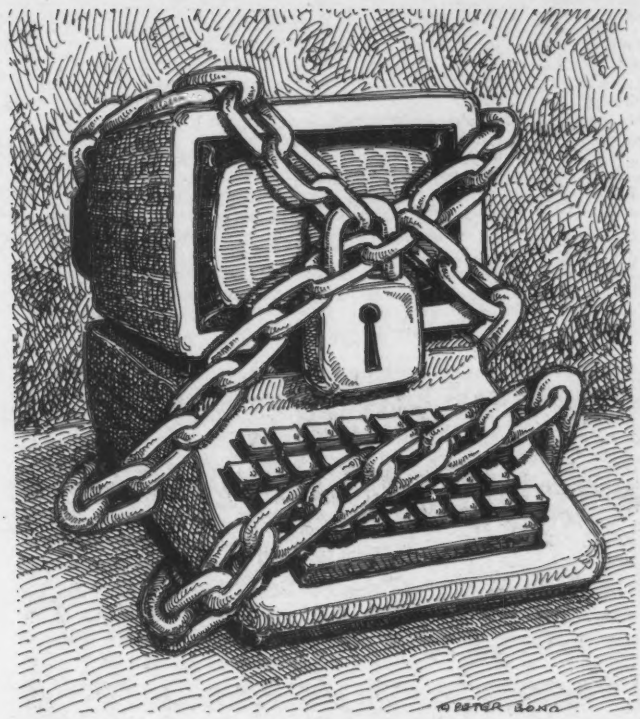

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human resource development. To everyone's relief, signs of cooperation are growing among DP trainers and their counterparts from the corporate training and human resource development staffs.

On balance, there are more reasons to be optimistic than pessimistic about the future of management training programs. DP trainers have been presented with a great opportunity: to shed the image of the past and establish themselves as the true custodians of the human resources in their DP departments.

Moving ahead

Before deciding to move ahead, you should have a clear idea of where you want to go. How do you know when you are doing an optimal job of providing your organization with the personal and management development training it requires? This may not seem like an easy question to answer, but if it's not addressed, neither you nor your superiors will be able to measure your progress and ultimate success.

Ideally, each manager, supervisor and key professional staff member in the DP department will be offered the opportunity to sit through at least one week's training on the subjects of communication, management styles, job contracting, motivation skills and team problem solving and decision making.

In addition, workshop reunions and refresher trainer sessions will be offered to reinforce the skills covered in the workshop sessions. Application of these skills will be recognized as a part of the required performance of all managers and key professional staff members in the organization's performance-appraisal process.

A new ethic

Finally, after the training, a new ethic for the organization will gradually evolve. This ethic will be characterized by a strong reliance on trusting, delegation and mutual respect among all members of the DP staff.

A similar ethic will develop in dealing with top corporate and user management. This new ethic will supplant the traditional, us-vs.-them attitude that has undermined past dealings.

If you can achieve the state described above, it is fair to say that you have arrived. Arriving won't be easy, and staying there requires hard work, too. But a few tips can make it easier.

Remember the "fried egg phenomenon." DP professionals are very particular about those from whom they will allow themselves to learn. Right or wrong, they have been conditioned over the years to expect little new knowledge from non-DP trainers.

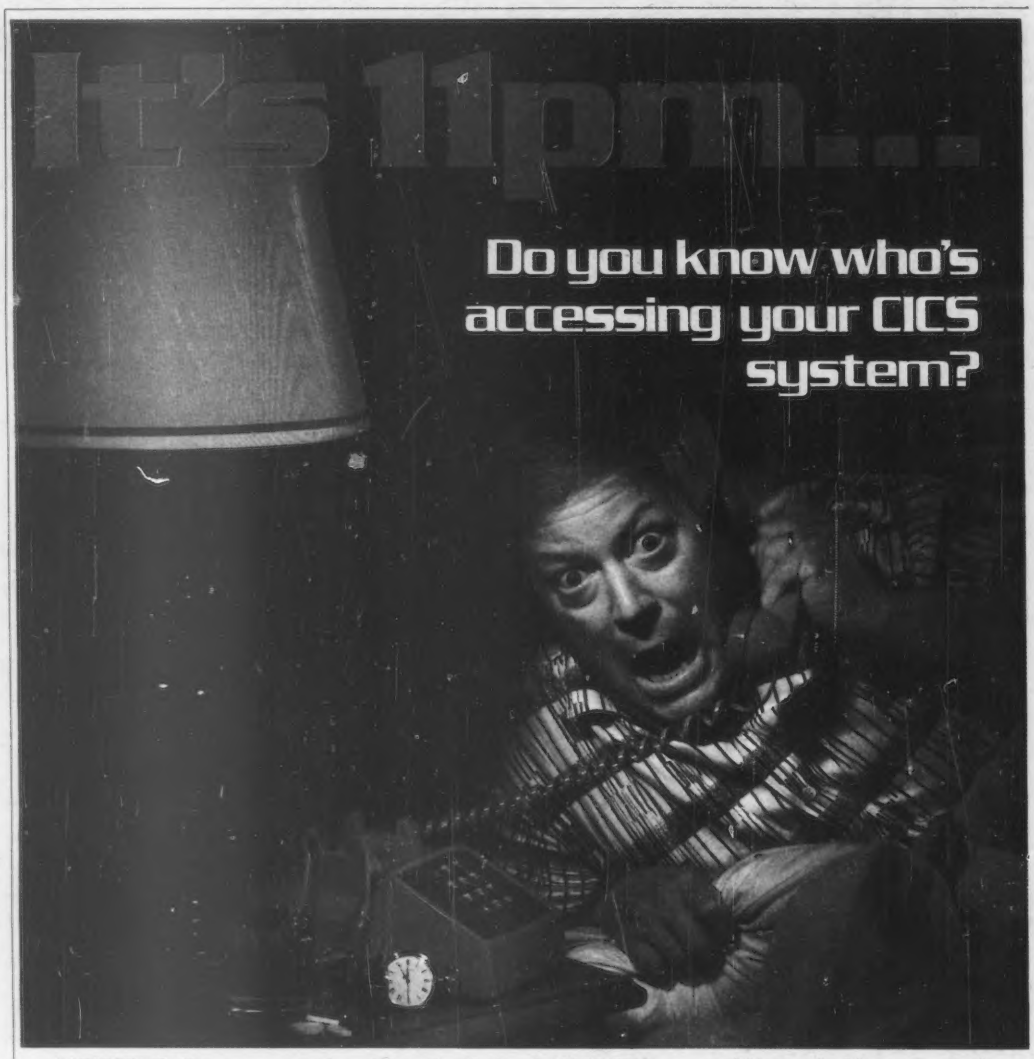
You must ensure that your DP management instructor possesses a solid DP background. Do the training yourself if you are qualified, ask members of the DP management staff to act as instructors or use a vendor whose instructors are bona fide DP professionals. Remember, unless you have a DP background, you can't teach a DP professional how to fry an egg.

Educate yourself first — become the expert. There is a great deal of information available about the effective approaches to managing people, some of it specifically tailored to the DP environment. Educate yourself. Call vendors and ask them to assist you in becoming acquainted with this subject area. Read the current best-sellers in the management area.

The best way to build your credibility is to overcome people's objections intelligently and tactfully. An expert is merely a person who has read, thought and articulated more about a subject than you have. Become that expert.

Offer "safe" training first. In any DP department, one group of people always seems to be willing to risk training before others will. This group may come from a certain level of management or project team or are subordinates of a certain manager. Test your management training on them first. They are your friends and are safer, in case the first offering doesn't go quite as well as you want.

Risk to schedule it. The first rule of management training is that you can never get everyone to agree on what, when, where or how. You can waste a great deal of time attempting to reach consensus; meanwhile, no training is being done. Work closely with your instructor



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or with the vendor involved. Tell them that you are scheduling the workshop on a "y'all come" basis.

If you level with the instructors or vendors, they shouldn't be upset if you cannot reach your minimum enrollment. Take the bull by the horns. If the course is any good, the second offering will be standing room only.

Use your vendors wisely. John Rose of PPG Industries, Inc. in Pittsburgh, who started his DP training career in 1957, summarized it best: "Never misuse your DP training vendors. They are a DP trainer's best friend."

Talk to your vendors. Let them know what you are attempting to do. Don't mislead them or promise them business when you are not sure if you can deliver it. Ask them to help you present the need for management training. With reasonable assurance that you will decide to acquire their training, they should be willing to visit your top management to present an overview of the program's benefits.

However, before asking your vendor to visit, be sure you have a commitment from the decision maker to attend the session. Above all, avoid scheduling and then canceling a vendor workshop. This costs the vendor time, money and the opportunity to reschedule instructors and leaves the vendor with a less than positive feeling about helping you next time.

Start from the top down. Assuming you are successful in obtaining a commitment from the top DP manager to support and be involved in management training for the DP department, start by having that individual attend and participate in the very first, fully tested session. You may encounter some resume resistance at first as well as some squirming and excuse making about not being able to afford the time, but press on!

The top DP manager's presence in the first workshop session will give the training the much needed blessing from the top. This will send a strong signal to subordinate managers that the top DP manager supports the workshop content, so they had better get with it and attend.

It also nips in the bud objections from subordinate managers who otherwise might say, while pointing a finger to the ceiling, "This is all well and good, but 'they'll' never buy this." "They" already have!

For the staunch resister at the top, try the old ego tickler: "We all know you don't need this training, but attend the session to share your experience for the benefit of those managers less experienced, effective and successful than you."

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> *The top DP manager's presence in the first session will give the training a much needed blessing from the top.*

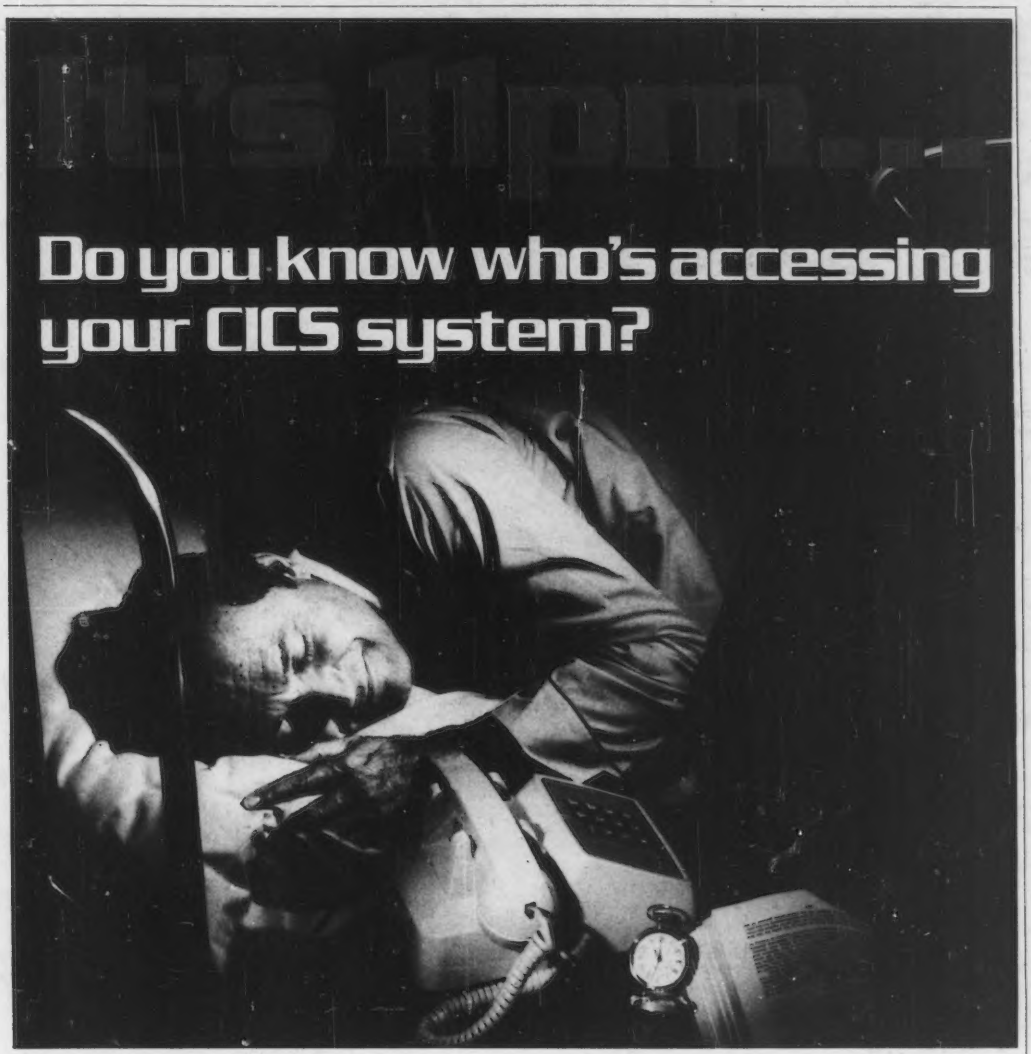
Random-distribution class consistency. Class attendees at personal and management development workshops should be selected without regard to function or level. This method of assignment offers the greatest opportunity for communication barrier removal and trust building during the workshop session itself.

Some high-level managers may feel their presence could stifle lower level managers from freely exchanging ideas about organization problems, management styles and so on. Although there is some validity to this point, the advantages of all levels sharing this learning experience far outweigh the disadvantages.

If the workshop is effectively designed to encourage interaction and make use of experiential learning techniques, real-world roles tend to melt away as the workshop progresses, and the rapport built during the session lasts forever.

Anticipate backsliding. DP professionals tend to be perfectionists, and DP trainers are no exception. Some managers and trainers alike become extremely discouraged when, shortly after the workshop, they observe themselves and others in the organization reverting to the old way of managing people.

Recognize, ahead of time, that this is the rule, not the exception. It is not a question of *if* backsliding occurs; it is a question of *when*.



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As a DP trainer, you must recognize this reality and stand ready to offer not only support and encouragement to the backsliders but also a solid program of workshop reunions, refresher training and focus sessions on subjects discussed in the workshops.

Establish support systems — ahead of time. Formalized retraining is a vital part of keeping the management development momentum rolling, and establishing a strong support system gives it the final push to success.

An effective support system includes small group sessions made up of workshop graduates who meet regularly to discuss victories and failures in applying workshop skills and to assist each other in resolving problems with subordinates, peers or superiors.

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> *Effective management is built on trust. Trust is built by risking, but not risking costs you, too.*

Support systems might include using an outside resource for individual, boss/subordinate or even team conflict resolution and counseling sessions. DP trainers can use the support system to further enhance their credibility as the custodian of DP human resources.

Prepare for environmental changes. Don't make the mistake of waiting until after the management development workshop to ensure that the work environment will allow people to apply what they have learned. A perfect way to frustrate people is to train them to use a skill and then make it impossible for them to use that skill when they return to their jobs.

Carefully ensure that top DP management is prepared to support every training objective — with their words and actions — after the training. For example, do not teach managers how to enrich their subordinates' jobs if top DP management will not accept that there will be a temporary but necessary reduction in job performance, perhaps organizationwide, as subordinates practice the skills of their newly enriched jobs.

Surprises can be avoided if DP trainers do their homework and communicate upward and outward before the training.

Don't stop with DP management. If you are teaching good management methods to DP managers, remember the people to whom these methods will be applied. Teach the rules for effective communication, cooperation and decision making to both parties in the these transactions.

As an adjunct to your DP management development training, you should plan to conduct workshops for people who must interact with DP managers, including top corporate managers, user managers and key staff members. Team-building workshops are particularly effective for building rapport and trust among these groups and for solving the tough problems they share.

Schedule off-site. Despite the fact that you may have the world's most beautiful training facilities, do anything you can to schedule your management development sessions off-site. Find a good retreat conference center deep in the woods, preferably without telephones and out of beeper range of your home grounds.

Make an agreement with top DP management that these training sessions will be free from daily distractions and interruptions. These sessions are too important to be devalued by people coming and going at random.

Attend each session personally. Even if you are not teaching the session, attend every management session personally. This offers several advantages.

First, from a purely practical standpoint, you can relieve the instructor of having to attend to logistical details; perhaps you can facilitate a part of the session yourself. Second, your presence sends to all who attend a strong signal that you value their training.

Finally, you can assist the instructor by adding continuity from session to session, especially when the time comes to confirm those values to which top DP management is committed.

Put your best foot forward. Here is your opportunity to change your past image and to shine. Don't blow it! You may never have another chance.

Take care of every logistical detail. Work closely with the instructor or vendor. Anticipate snags and last-minute changes. Try to eliminate any element of the physical arrangements that might detract from the effectiveness of the workshop. If you have to be absent, send someone to stand in for you.

Remember, poor physical arrangements or logistical coordination can turn an 'excellent' workshop into an 'average' workshop in the eyes of the attendee. Don't be sandbagged by a petty detail.

Today's finest management development workshop teaches DP managers that effective management is built on trust. Trust is built by risking, but not risking costs you, too. Which price have you personally chosen to pay when it comes to your involvement in the need for management training for your DP department?

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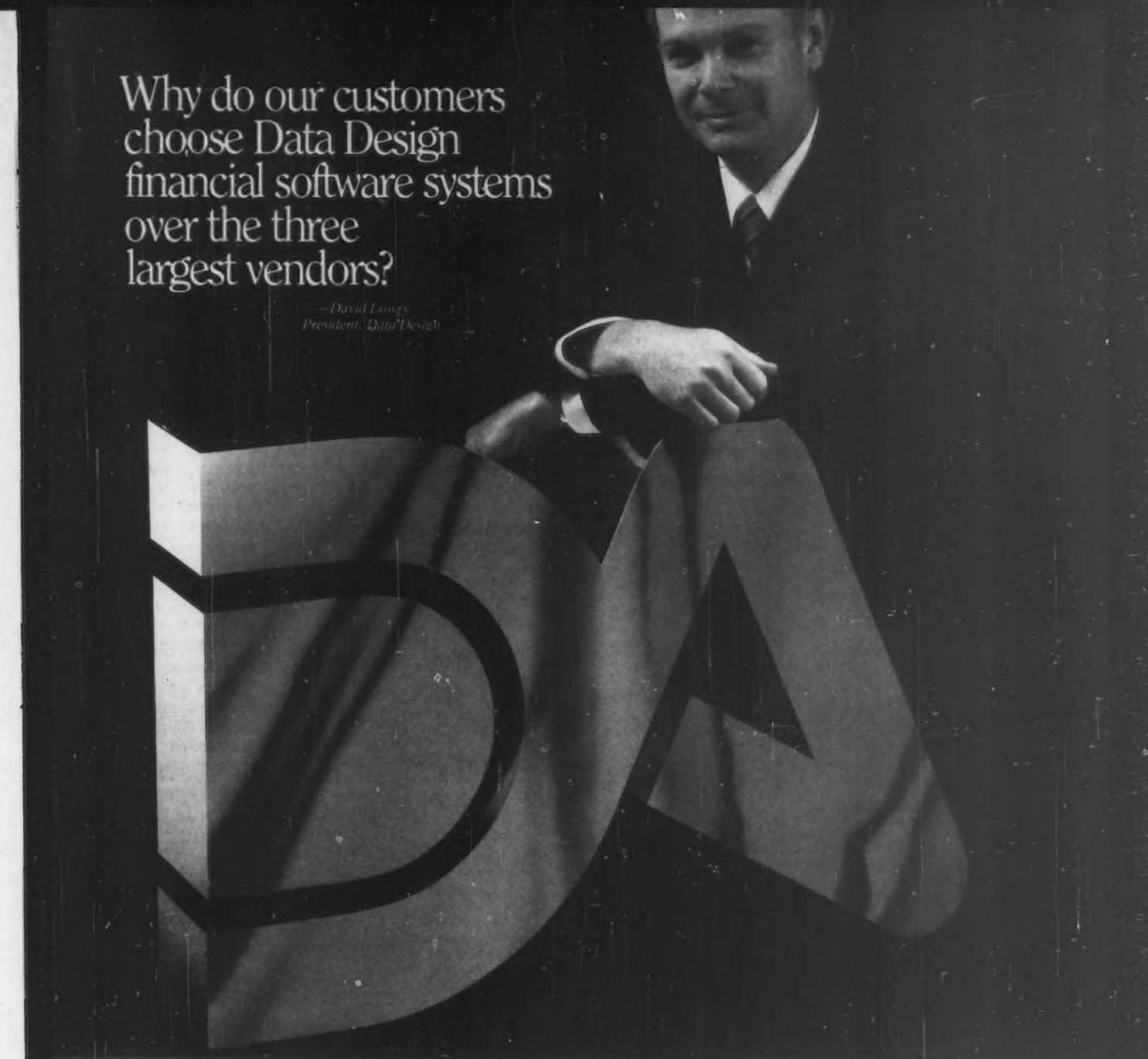

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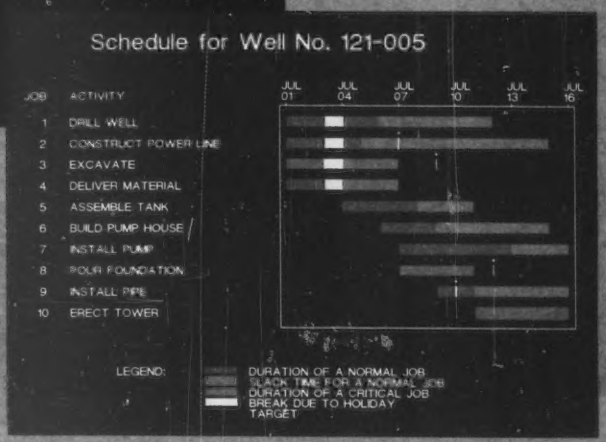

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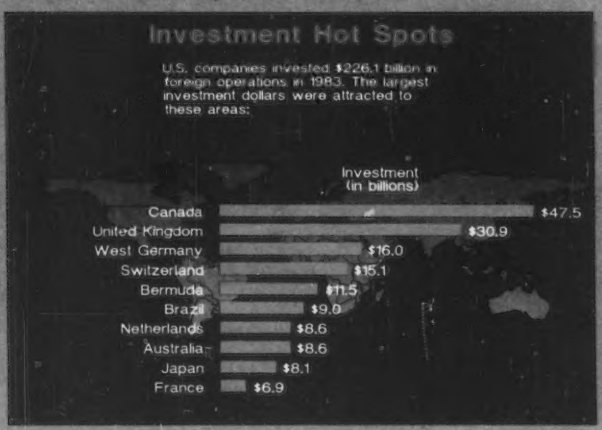

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IN DEPTH

A Fast way to define system requirements

By Gary Rush

Facilitated application specification techniques — Fast — bring end users and DP together to define needs, gather information and propose solutions. The goal is a system that suits everyone on the first try.

MIS has long applied productivity techniques to the problems of coding and testing computer applications. Now DP planners also are trying to develop better application requirements and design specifications as a way to increase productivity.

Over the past eight years, several companies have developed specific techniques to address the problems of communication between data processors and end users. Facilitated application specification techniques (Fast) focus on the information-gathering stage of system design. Fast sessions bring DP staff and end users together, making design an interactive process.

Corporate clients are trained in the technique of their choice by one of several vendors and then conduct sessions in-house. The hope is that negotiations at the early stages will ensure smooth operations later on. If end-user requirements are spelled out in flow charts and brought face-to-face with DP considerations at this early stage, the final system design will suit the organization more precisely, boosting productivity over the system's lifetime.

As word of their success spreads, these interactive design techniques are finally being accepted and implemented in various companies in the U.S. Major corporations are investing in visual aids and training for session leaders. For the first time since these techniques were developed, a variety of consulting and training assistance is also available.

Interactive design has a direct impact on DP professionals' ability to deliver error-free applications. DP management is all too aware that reducing errors is one of the most effective ways to reduce the cost of computer systems. Now studies at ITT Corp., IBM, TRW, Inc. and Mitre Corp. indicate that error removal constitutes up to 40% of the cost of a system — and that between 45% and 65% of these errors are made in system design.

Numerous analytical methodologies, design methodologies and programming techniques have been developed to address the error problem. While these work well for analysis and design, they have not always successfully addressed the interviewing and information gathering process that must take place to provide input. Now Fast has made a science of information gathering.

The information gathering process bogs down for two major reasons. The first is the communication gap between DP and the business community. In *An Information Systems Manifesto* (Prentiss-Hall, 1984), James Martin says, "When the traditional systems analyst and potential end users first come face-to-face, they come from widely different cultures. It is rather like a Victorian missionary first entering an African village."

This language difference brings about the second major problem: the invariable power struggles between the players involved. The end user demands systems faster than DP can deliver them, or else DP creates a sort of technological blackmail over the end user. Often these power struggles are not even intentional but result from widely different approaches to and views of the same problem.

Four major techniques have been developed since the late 1970s to address the information gathering problem. They are Joint Application Design (JAD), Consensus, Wisdm and The Method.

In 1977, IBM developed JAD to help extract requirements for distributed systems implementation. Boeing Computer Services Co. adapted a technique that was used to design the Boeing 747 aircraft and started Consensus. Wisdm was developed by Blair Burner at the Western Institute of Software Engineering (Wise). Performance Resources, Inc. took the JAD technique, modified it to work better for decision support systems and called it The Method.

Structured agenda

All of these methods are geared toward the front end of the system design life cycle. They help users define an application from its first conception through the complete design. These techniques can

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Gary Rush is president of MG Rush Systems, Inc. in Newton, N.J. He implemented JAD at CNA Insurance Co. and initiated the JAD project at IBM's user group, Guide, in 1984.

be used for every new development or maintenance system project in a company.

Fast sessions range in length from one three-day workshop to more than 30 workshops to bring the design to a point where it can be turned over to technicians for programming. Any project that requires more than one person's input on decisions can profit from interactive design techniques such as these.

Typically, the project manager will initiate using Fast in the company before the start of a new project. The project manager may contact a Fast vendor for training or licensing or else present the idea to top management to make the contact. Occasionally, other DP staff members or even end users will be the initiators. In any case, the project manager will not end up actually leading the sessions, as the session leaders' success depends ultimately on their position as objective outsiders.

Diverse views

Each Fast method focuses on a slightly different aspect of the customer's needs. JAD primarily addresses the detailed external business design problem. It has a structured agenda that follows the flow of work through a work area and details each stage: planning, receiving, tracking, assigning, processing, recording, sending and evaluating the work.

Each JAD session is lead by an impartial session leader who is responsible for controlling the agenda and the numerous visual aids. The session leader, with the project manager's help, prepares beforehand, tailoring each session with application-specific information. The leader must also ensure that management, users and DP come to the session with the same purpose and objectives and that the scope of the session is clearly laid out.

JAD stresses the use of business rather than technical language to encourage participation and enhance group dynamics. Visual aids in the form of vinyl magnetics, slides and Vu-Graphs help drive the detail and quality of the design.

JAD sessions typically run three days and involve both technical and managerial personnel. Participants are key staff within the business area for which the system is being developed — whoever is in the best position to describe the business functions, information and data needs, transactions, design screens, reports and document changes to the work flow.

Companies such as American Airlines, Inc., Texas Instruments, Inc., IBM, Mutual Life Insurance Co. in New York and Bell Canada have been using JAD successfully. Some recorded increases in productivity ranging from 20% to 60% during the requirements and design process.

CNA Insurance Co. in Chicago conducted a trial of the JAD technique in 1983. CNA used the Function Point productivity measurement technique from IBM to evalute JAD's effectiveness. A control project that did not use JAD was measured along with the pilot project. The control averaged eight hours per function point during the requirements and external design phases of development, whereas the pilot averaged 2.5 hours per point — more than a 200% increase in productivity.

High-level planning

Consensus covers four areas: strategic planning, management planning, requirements definition/analysis and preliminary design. Like JAD, Consensus primarily covers the higher level planning issues. Consensus does not delve into screen and report design. It does, however, cover business functions and information or data needs in detail.

The session leader in a Consensus session will not use numerous visual aids other than Vu-Graphs and flip charts. On the flip charts, the session leader will draw graphic representations of the system using data flow and information flow diagrams to aid the discussion.

The workshops generally run long hours (12 to 14 hours a day) and often for up to two weeks for larger systems, with a majority of the participants staying the entire time. The users of Consensus report up to an 80% reduction in elapsed time and a 50% reduction in costs for the requirements fathering process. Consensus is used by such companies as AMP, Inc., Boeing Computer Services Co., First Interstate Bank and Blue Cross/Blue Shield.

Brainchild

Wisdm was conceived by Blair Burner while he was an employee at Boeing Computer Services in the mid-1970s. In the late 1970s, Burner formed Wise, where he perfected and began marketing Wisdm.

Wisdm is similar to Consensus in that it is aimed primarily at front-end analysis. The first step in a Wisdm analysis is a thorough Problem Definition and Analysis workshop, generally consisting of key managers from the business area involved, which defines the business problem clearly. The second step is a Requirements Definition and Analysis workshop, followed by the final step, a Business System Design workshop. Wisdm, unlike Consensus, runs six to eight hours per day for three to 10 days.

In the last step, the requirements, business flow, data needs and major processes are defined in a step-by-step process leading to a complete design:

- Defining the external interfaces.
- Defining the external inputs and outputs.
- Building an interface model of the input and output flow.
- Defining internal functions.
- Building a graphic model of the functional flow.

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- Defining the internal and stored data.
- Constructing an input/output specification model.
- Constructing a data flow model.
- Defining the general current and future requirements for the system.

Wisdm design workshops require two session leaders, one of whom sometimes takes the role of an apprentice in preparation for a future session. Wisdm makes heavy use of matrices and other visual aids to illustrate data elements. Unlike JAD, Wisdm does not extend into the detailed design portions of systems design. Wisdm is used extensively by the consulting firms of Wise and Comp-U-Staff and has been used at the Hartford Fire Insurance Co.

Hybrid technique

The Method is really a hybrid of the JAD technique. It was fashioned because decision support systems did not fit easily into the transaction flow agenda of JAD. Developed by Performance Resources, Inc. while working with AT&T, The Method is now used at CNA Insurance Co., AT&T, the Chase Manhattan Bank NA and some government agencies. The Method addresses decision support better than JAD in that it is more data driven: Data is identified earlier in the process and then is organized to help develop decision support.

The Method provides for planning sessions, a work analysis to set the scope of the sessions, a structured agenda and an impartial session leader. In this case, session leaders are certified before running any sessions. Session leader training includes instruction in group dynamics plus specific software support to aid the session leader in planning workshops, scheduling time and tailoring the workshops to particular applications.

Implementing the techniques does incur costs. Implementation requires investing in training and materials, customizing the technique, securing workshop facilities, recruiting session leaders and conducting pilots. Training and implementation expenses can range from $3,000 to more than $100,000, depending on the amount of consulting support desired, the number of leaders trained and the amount invested in workshop facilities.

> *The Fast methods are designed to extract high-quality business system specifications from end users in a compressed time frame using a workshop environment.*

But as a rule, this initial investment is easily recovered. On a typical 2,000-hour project, 20%, or 400 hours, of the time is spent in requirements and design. If the productivity of this phase of work is increased a conservative 25%, the requirements and design phase will require only 300 hours, saving 100 hours. Depending on internal company billing rates, this 100 hours can be worth from $3,500 to $7,000.

Even with a worst-case investment and return, the investment pays for itself after the 28th project — or much sooner when the technique is used on larger projects. Typical investments and returns are generally far from the worst case.

It is important to test or pilot the technique on one project with a good chance for success to determine how much customizing is necessary and how well the technique fits within the organizational climate. This initial pilot of the technique is the best way to sell the concept internally and gain acceptance.

Each of the four Fast methods has strengths and weaknesses. But boiled down, they are all structured meeting techniques designed to extract high-quality business system specifications from end users in a compressed time frame using a workshop environment. They are not replacements for analytical methodologies, but they can all work with and supplement any methodology.

Fast elements

All of these techniques have certain common elements that both characterize them and determine their success. If customers modify or customize a technique, they should take care to preserve these key elements: a structure or formalized process, a dynamic workshop environment, an impartial session leader, a focus on information gathering and business system design and well-defined goals (producing system specifications and objectives and predefined documentation forms).

Each technique also stresses end-user input and ownership of the system and requires end-user commitment both at the outset and the completion of the sessions. Good visual aids and comprehensive documentation are also important.

Structure is important to these techniques because the structures chosen are built on proven methods. The sessions have an agenda, a purpose and objectives. The workshops are orchestrated, not ad hoc, which helps ensure that they do not turn into time-consuming brainstorming sessions or uncontrolled discussions.

Often the structure is as simple as following the flow of actions against a piece of work and asking end users the following questions at each stage:

- What functions are you performing at this point?
- What information do you need to complete these functions?
- What do you want done with the information?
- How do you want the information displayed?

These questions are repeated for each step of the work flow.

The workshop environment and dynamics of

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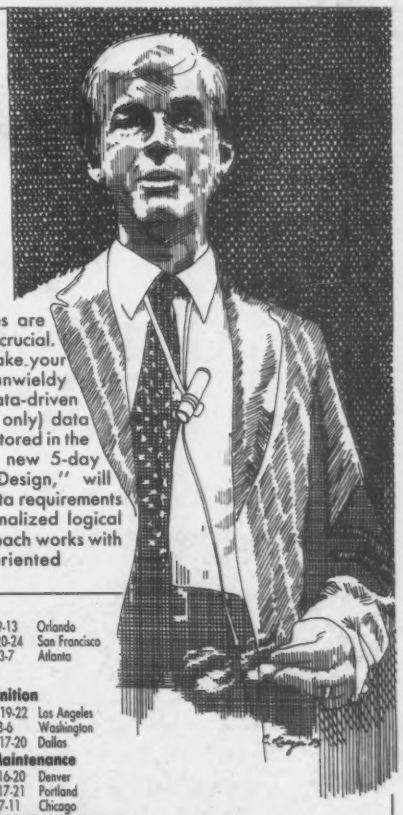

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a group help session participants concentrate on idea sharing, avoid politics and ensure that the information provided is complete. Group dynamics help avoid politics because groups tend to police themselves. The participants develop into a team by working together; in such a group pettiness and politics are seen for what they are and quickly disappear.

A key to creating this group environment, however, is having the right people in the workshop. These people need to be knowledgeable about the business and have the authority to make decisions about the design. In the workshop, end users will be asked to describe their business functions, information needs, data elements used and how they want to interface with the system. They will describe how the screens and reports should look and how the system will affect their business.

The type and number of participants vary, based on the level of detail being discussed in a workshop. In high-level planning workshops, there are up to 25 participants. These participants are the decision makers and managers of an organization. In workshops concerned with details of screens, reports and workflow design, there are fewer participants (usually a maximum of 12), and these will be the lead technical people in the end-user departments, their supervisors and perhaps a manager or two.

DP is represented by the project leader and one or two lead technical advisers, who assist in answering questions about other systems, feasibility of design items and some cost estimates. The advisers make alternative suggestions when cost becomes a deciding factor. The session leader and one or two people to capture the documentation round out the participants.

An impartial session leader can eliminate the power struggles and communication gaps. A 1984 study, "Management Science," by DeBrabander and Thiers of the State University Centre Antwerp in Belgium found that "the presence of a third part which stimulates the user to neglect the possible implications of power asymmetry . . . nullifies [this] disturbing effect." Their study noted that the most effective type of facilitator is an active question elicitor. This type of session leader induces the quieter or less assertive workshop members to ask more questions or to respond when someone else takes a position.

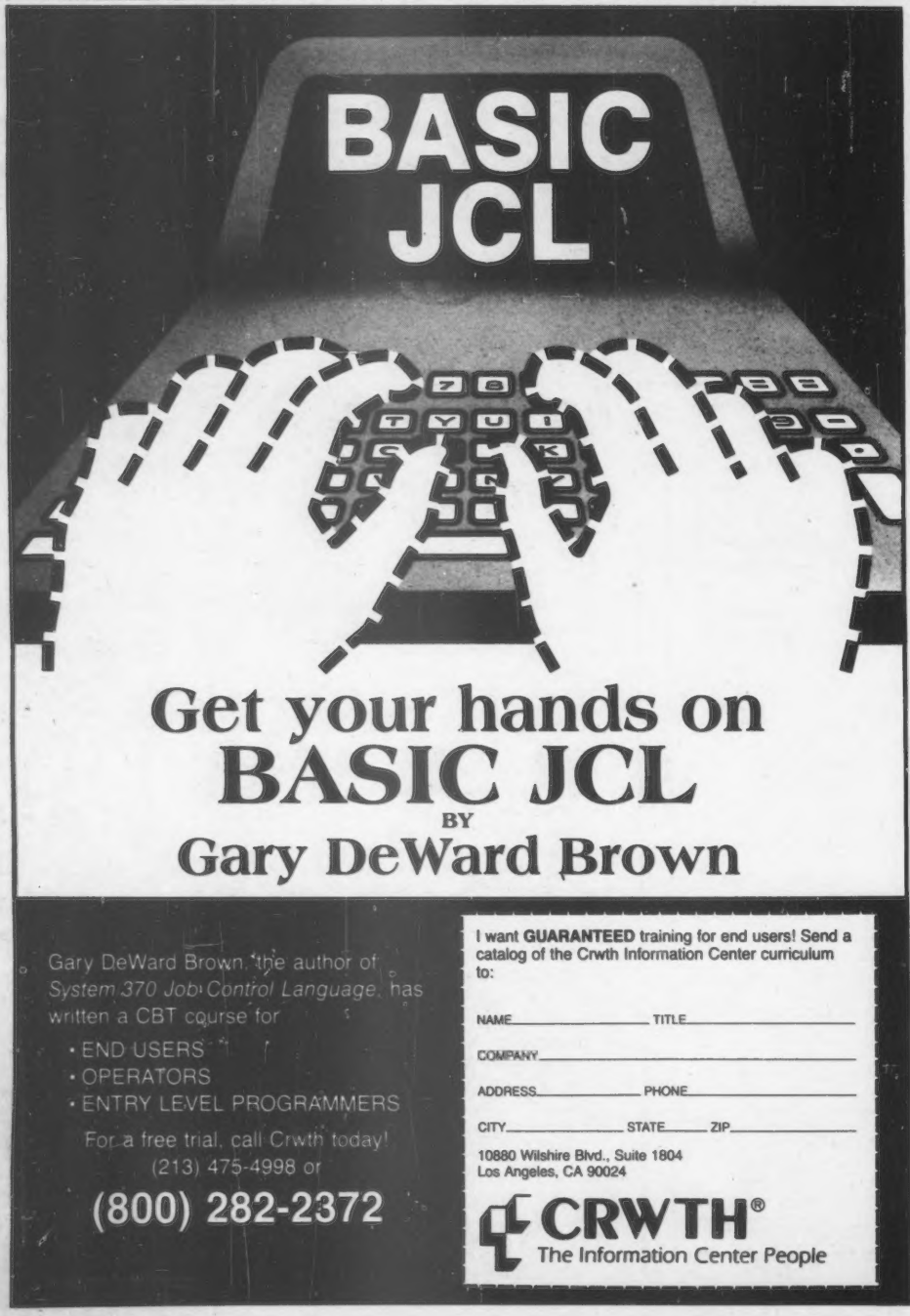
This type of facilitated discussion puts DP and end users on equal terms and sets them up as partners. The session leader assumes the role of a referee at times, arbitrating debates between DP and end users or between groups of end users. When an issue arises that cannot be decided in a workshop, the session leader notes down the issue, and the group assigns someone to be responsible for its resolution. The goal is to discuss ideas fully and to reach decisions as a group without delaying the process in undue haggling.

Most of the techniques rely on **the use of visual aids** to help with communication. Better communication is, after all, the primary reason for structure, session leadership and the workshop environment. Often problems arise because the participants define terms in different ways. Defining terminology and building pictures of the evolving application serve to avoid misunderstandings and boost the group's productivity.

Magnetics, slides, Vu-graphs, charts and drawings are all used in Fast sessions. Figure 1 illustrates slides used to help clarify terms and workshop process. Understanding what "input," "data flow" or "function" means eliminates ambiguities and confusion. Through charts, the workshop can build up an application step by step.

Well-defined documentation is important to the consistency of the methods. Documentation is usually specific information recorded during the sessions. The documentation itself actually becomes the requirements specifications, so recording the sessions thoroughly determines, to some degree, the workshop's usefulness.

The level of documentation detail will depend upon the level of the session. Planning sessions document



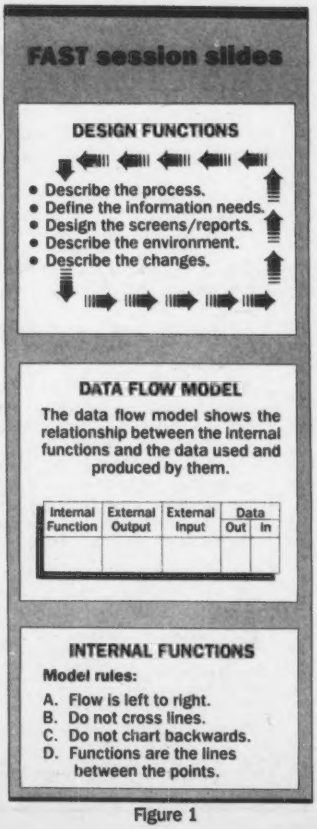


Figure 1

the business problems, general requirements, action plans and priorities. Detailed design sessions produce the documentation needed to develop programming specifications.

More than a meeting

New Fast customers will often ask "What is the difference between these techniques and a well-run meeting?" There are several answers.

The Fast method can be repeated because they are internally consistent and have been tested. Leaders can be trained in any of the techniques. Each technique holds known, explicit objectives.

Well-run meetings, on the other hand, depend on the skills of the meeting leader, who has not been specifically trained for the task. In general, the results of even a well-run meeting are unpredictable. In organizations where meetings are well run, Fast methods provide additional benefits to the application design information-gathering activities.

Each technique has its strengths and weaknesses. No one is all encompassing. Documentation during the sessions has been a problem, and there is no well-developed automated documentation tool. The techniques all have been modified when brought into a company other than the developing company, and since these are relatively new and implemented differently in each organization, help for customers has not been readily available until just recently.

Most corporate customers do not feel comfortable implementing these techniques without help from a consultant or the product vendor. Many vendors license individuals rather than companies to use their techniques and are reluctant to customize their technique for a particular company. Those that will customize their technique often charge a hefty consulting fee to do so.

There are six primary companies offering services relating to interactive design sessions. IBM Information Systems Services and JAtech Designer Systems Ltd. offer contract JAD session leaders and JAD training. Performance Resources, Inc. offers contract session leading plus training and certification in The Method. Wise offers contract session leading as well as training and licensing in Wisdm.

Boeing Computer Services offers contract session leading and training in Consensus. MG Rush Systems, Inc. offers contract session leading and training in a combination and adaptation of various techniques. In addition, various consulting companies are beginning to offer contract session leaders as part of their services.

On the plus side, Fast methods have worked very well. End users are satisfied and generally become better allies of DP. In one case, the users emphatically told the vendor to provide more support for the process so that they could use it on all of their systems. At least four companies (AT&T Communications, American Airlines, CNA and TI) have trained numerous session leaders and use interactive design for many of their projects.

The specifications developed from these methods have been more thorough, better documented and more consistent than with a less rigorous approach as well as being obtainable more quickly and at less expense. Using a facilitated technique helps reduce maintenance because specifications are more fully developed and users know their system better. These methods can also enhance other analytical and design methodologies, including prototyping.

To succeed, the initial project should have the following:

- End users hungry to have a system developed for them.
- Cooperative, committed DP and end-user personnel.
- A project requiring no more than 12 to 18 months of development effort.
- A project that is primarily an on-line, transaction-based system.
- An application for which the underlying business is well defined and not controversial.

The initial use of a technique in a company is more critical for a session leader than the first workshop. Companies will not give a technique a second chance if it fails on the first try. A session leader, on the other hand, can often recover if the first session is not a great success.

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as Index Technology Corp.'s Excelerator, IBM's System A or Technology and Information Products Corp.'s Extim facilitate thorough, well-organized documentation. Data dictionaries such as CGI Systems, Inc.'s Pacbase or IBM's Data Dictionary can help make the documentation a living portion of the application.

The data dictionaries also can help in developing prototypes or feeding prototyping tools. Finally, word processors and specification languages can be used to capture documentation.

Good training has not been easy to find. Most developers of the techniques teach only the technique itself. But training must also cover group dynamics, the facilitator concept, the specific implementation of the technique, systems analysis, tools for use in the workshop and the documentation process.

Regardless of the technique, each session will be somewhat unique, and the session leader must be capable of adjusting to different situations. Knowing the technique alone will not be enough.

The only vendors or consultants that provide extensive training are Performance Resources and MG Rush Systems. Both provide training in the design technique as well as in facilitation and group dynamics.

Performance Resources trains students in The Method using effective presentation techniques and facilitation training to enhance the session leader skills while providing basic instruction in the design technique. MG Rush trains students in a variety of design concepts using group development, adult learning and facilitation training to enhance the session leaders' skills. Some customers have developed their own in-house programs that do a good job of training session leaders.

Selecting session leaders is also not easy. These people need to be well respected and feel comfortable standing in front of a group of people. They need to be able to control controversies and stay flexible. Above all, the session leader must be confident and well prepared.

Almost all session leaders have come from the DP ranks. A few have come from marketing backgrounds. Most session leaders are capable technical people with a high degree of communication and people skill.

The DeBrabander and Thiers study found that the most effective facilitators "are characterized by an interpersonal, time and goal orientation. They must have high influence throughout the organization . . . derived from technical competence."

Need for change

The future for these techniques is bright, but all will need to evolve. Vendors need to keep the techniques current with the changing business environments. For example, non-DP personnel are not as unfamiliar with computers as they were in the mid- to late 1970s. The types of applications being developed are changing from heavy transaction systems to smaller decision support, information or specialized transaction systems.

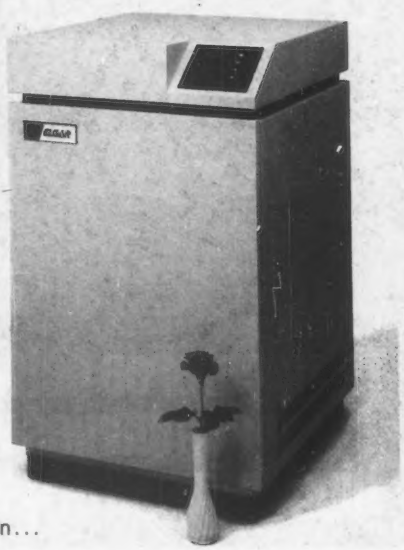
Fast techniques are also being used for more than data processing. They have been used to design robots, grain elevators, strategic planning — even to improve staff meetings. Customers need to understand the techniques fully so that they can integrate the techniques into their existing ways of building applications. If a methodology is being used successfully in a company, then it should be integrated so that it augments rather than replaces the methodology.

Guidance in planning, understanding, documentation and training is needed and must come from vendors and practitioners. The techniques need to be customized and integrated fully with local methodologies without compromising either one.

The techniques do work. They work well when customers invest some effort in understanding them. Sessions should evolve from the proven techniques and build on the experiences of the practitioners.

Most DP professionals will agree that getting better requirements and more user involvement will ensure better systems and reduced maintenance. Clearly these techniques assist in this; furthermore, involving users in the process of designing their business systems makes the users feel that the system being developed really is *their* system.

You may ask why Elgar's new UPS looks just like an IBM System/36? ...Why indeed!



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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

CD-ROMs eye big payoffs

OK, so now we have cheap desktop drives that can read half a gigabyte off those jazzy-looking little optical disks, but what will we do with them?

The first commercial systems based on compact disk read-only memories (CD-ROM), the optical read-only systems based on the same technology as the Compact Disc audiodisk players, are just appearing. Next year the storage systems will be configured for standard personal computers, in the same size as today's disk drives, with off-the-shelf price tags expected to slide below $700.

Major hurdles must be overcome before CD-ROMs storm the desktops of America — including production ramp-up glitches, slow turnarounds on the disks, a lack of standard data access methods and the never-ending chicken-and-egg problem involved in getting software written for new equipment. But some intriguing applications already have emerged.

This month Grolier, Inc. of Danbury, Conn., is scheduled to ship its 21-volume *Academic American Encyclopedia* on a CD-ROM disk for $199. IBM Personal Computer users equipped with an optical drive will be able to complete a search for a particular word or group of words throughout the nine-million-word encyclopedia in three to five seconds, according to Grolier.

Early next year Ingram Book Co. in Nashville will market Lasersearch, a book identification and purchasing system also built around an IBM micro and an optical player. Designed to give librarians access to information on 1¼ million titles, the system also will make

Continued on page 63

Consulting firm's micros blur lines between jobs

By Eric Bender

CAMBRIDGE, Mass. — Along with aiding in many jobs at Arthur D. Little, Inc. (ADL), personal computers have raised some unanticipated short-term problems and some unanswered long-term questions about the way professional and support staffs will work together, a recent round-table discussion showed.

The international consulting firm, which employs approximately 2,600, began a big push to replace IBM Displaywriter word processors with IBM Personal Computers during the past year in many groups. "One reason we went to the [Personal Computers] was that we didn't want to buy those $10,000 machines anymore," MIS manager Toby Choate said. Another important rationale was that personal computers can handle many different types of tasks, he said.

As the IBM machines have been added to the company's collection of micros, more professionals have joined the early adapters who type up initial drafts of letters and reports themselves.

Homer Hagedorn, a consultant who made that shift two years ago, is an enthusiastic proponent of the Tandy Corp. Model 100 laptop. "I produce a first draft that is more articulate, more concise and better organized than my second draft used to be," Hagedorn maintained. Previously, he would dictate to his secretary, and "she'd probably spend four or five hours just trying to type it," he said. "And worse than that, she'd have to listen to me."

Hagedorn also gave rave reviews to the micro's ability to tap into GTE Telenet Communications Corp.'s Telemail service. Once a message gets into Telemail, "I've indicated all the people it's supposed to get to, and they get it simultaneously," he said. "It doesn't make any difference to me whether they're in Wichita or Washington, they will open the mailbox and find what I have to say, and there are no pink

Continued on page 66

Orchid board announced

Orchid Technology of Fremont, Calif., has introduced an expansion board for the IBM Personal Computer and Personal Computer XT that is said to incorporate three boards in a single card slot.

Conquest is a multifunction board, complete with IBM-compatible serial and parallel ports as well as a clock. It is also an expanded memory board, supporting the Lotus Development Corp./Intel Corp./Microsoft Corp. Expanded Memory Specification.

Additionally, Conquest offers the ability to adapt an Orchid PCNet local-area network daughtercard without taking up a second slot in the personal computer.

Conquest offers up to 2M-bytes of memory that can be used to fill both conven-

Continued on page 66

Lotus rolls out 1-2-3 Release 2

Lotus Development Corp. shipped Release 2 of its best-selling 1-2-3 analytical software package last month for IBM Personal Computers and compatibles. The version costs $495, the same price as the original product, the Cambridge, Mass.-based vendor said.

The upgrade kit for Release 2, selling at retail for $150, includes a coupon from Intel Corp. offering a $40 rebate on the Intel Above Board expanded-memory product. That promotion will run through July 31, 1986.

The new version supports Intel 8087 and 80287 coprocessors, and its maximum worksheet size has been expanded to 256 columns by 8,192 rows.

■ Data General cut pricing on its Data General/One laptop micro/**54**

■ Santa Cruz Operation announced Xenix System V software for the IBM Personal Computer XT and AT/**54**

INSIDE

Software/**55**

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IBM SQL/DS and DB2 relational DBMS now on PC

ORACLE, the relational DBMS compatible with IBM's SQL/DS and DB2, is now available on the IBM PC/XT and PC/AT. While SQL/DS and DB2 run only on IBM mainframes, ORACLE runs on IBM mainframes as well as on DEC, DG, HP and most other minis and micros. Any application written for SQL/DS or DB2 will run without modification on the complete range of systems supporting ORACLE, including PCs.

SQL/DS and DB2 are relational database management systems; ORACLE is a relational DBMS plus an integrated set of 4th generation software tools for application generation, report writing, color graphics and network communications.

Oracle Corporation introduced the first relational DBMS in 1979. Now, ORACLE provides the only complete implementation of the IBM-standard SQL language available for the PC.

Oracle Corporation cites three principal application areas for its product's capabilities:

■ **The ORACLE Application Development Center** provides a PC-based development center for the creation of DB2 and SQL/DS applications. The flexibility of the personal computing environment is made available to programmers creating applications for use with IBM's relational database products.

■ **The ORACLE Personal Information Center** extends the Information Center concept to the Personal Computer. ORACLE's application generator, graphics, spreadsheet and other end-user tools provide a SQL/DS and DB2 compatible Information Center on the desktop.

Users can become acquainted with the facilities and power of the Information Center in the personal computing environment, and transfer their knowledge and skills as the MIS Information Center facility evolves. The ORACLE Personal Information Center provides the facilities for MIS to develop the cooperative relationship with end users so vital to the success of the Information Center.

In addition, with ORACLE on departmental superminis, users can create identical Information Centers at the department level.

■ **The ORACLE Distributed Information Center** provides an intelligent set of communication links among multiple systems, with ORACLE running on IBM mainframes and various minis and PCs.

Using ORACLE's SQL*LINK networking facility, ORACLE on such diverse systems as MVS, VM/CMS, VAX/VMS, UNIX and PC/DOS can selectively exchange database information using the full capabilities of the SQL language. Applications, portable across all environments, can be run identically on any system, and data can be intelligently extracted for use at any site.

ORACLE is currently installed on over 1000 supermini and mainframe systems around the world, as well as on thousands of PCs and compatibles. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and many government agencies.

For further information, contact Oracle Corp., Dept. C, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350.

Xenix System V debuts for IBM micros

Santa Cruz Operation, Inc., a Santa Cruz, Calif.-based software firm, has announced Xenix System V, a multiuser, multitasking version of AT&T's System V.2 operating system, for the IBM Personal Computer AT and XT.

Xenix System V consists of three packages: the Xenix System V Operating System, Xenix System V Software Development and Xenix System V Text Processing.

The Xenix System V Operating System consists of a full set of Xenix utilities to run business applications, administer the system, edit files and communicate with other users. Standard features include the Unix System V command interpreter shell, C shell, full screen visual editor, system administration commands and electronic mail, according to the vendor.

With the Xenix System V Multiscreen feature, a user can press one key to call up a screen display from up to 10 applications programs. With a "set color" option, a user can control the background and foreground color of a color monitor display, the company said.

Xenix System V can support up to 10 remote users on serial ports in addition to the console. The product supports the use of floating-point instructions. A hard disk drive can be shared between Xenix System V and the IBM PC-DOS operating system, allowing the user to alternate between systems. The operating system also includes utilities for moving files between PC-DOS and Xenix.

According to Santa Cruz Operation, the Xenix System V Software Development Package supplies tools needed to write C and assembly language programs.

The Text Processing package contains tools for the preparation of documents.

Xenix System V Operating System and the Software Development package each cost $495, and the Text Processing package costs $295. Together, the three products sell for $995. They are all scheduled for October availability.

DG lowers laptop prices

Data General Corp.'s Desktop Division in Westboro, Mass., has cut prices between 23% and 32% on the three models of its Data General/One laptop computer.

A model with 256K bytes of internal memory and a single disk drive now costs $2,195, down from $2,995. A dual-drive system with 256K bytes of internal memory costs $2,695, reduced from $3,495, and a dual-drive version with 512K bytes of internal memory costs $3,195, down from $4,695.

Price tags on add-on memory also were slashed. Incremental memory of 128K bytes now costs $250, down from $600, and 256K bytes of memory costs $495, down from $1,200.

Polytron airs bundling pact with Quadram

Polytron Corp. of Hillsboro, Ore., together with Quadram Corp. of Norcross, Ga., announced that Polytron's Polywindows Deskplus desktop utility management system is now being bundled with certain Quadram board products.

Polywindows Deskplus is a memory-resident program designed for the IBM Personal Computer, Personal Computer XT and AT. It is said to enable users to access several desk tools and other micro enhancements via windows appearing over the other program being used.

Purchasers of Quadram's Quadboard, Gold Quadboard, Silver Quadboard, Liberty Board or Quadsprint personal computer add-on boards will receive a version of Polywindows Deskplus without copy protection as well as a user's manual.

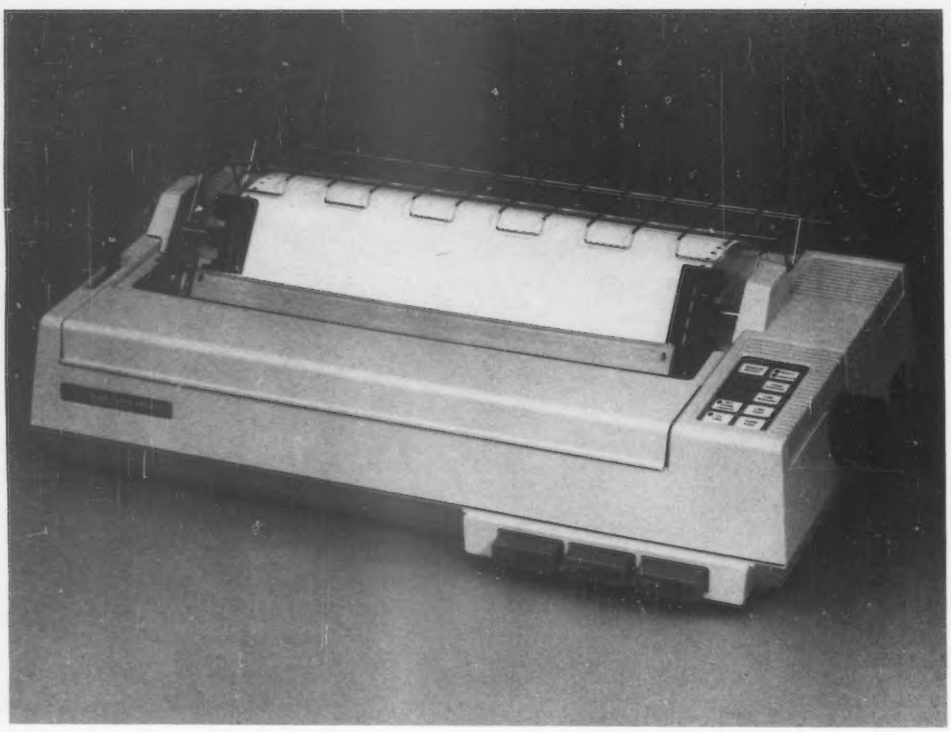
The non-copy-protected version of Polywindows Deskplus costs $84.95.

Ericsson cuts cost of desktop, peripherals

Ericsson Information Systems, Inc. in Greenwich, Conn., has cut the prices of its desktop personal computer and peripherals by between 15% and 25%.

The basic 128K-byte personal computer with a single floppy disk drive, monochrome monitor and graphics card now costs $2,145. With 256K bytes and two disk drives, the system sells for $2,450. A 256K-byte hard-disk version with two drives and a monitor is priced at $3,760.

Prices of color and monochrome monitors, 128K-byte memory cards, internal modems, letter-quality printers and all Ericsson PC Ergo options were reduced by an average of 15%.



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SOFTWARE

■ **Applied Microsystems, Inc. has announced an enhanced version of its icon-driven Office software for the IBM Personal Computer.**

The product's on-screen handling functions have reportedly been rewritten completely in assembly language for faster response time. Other new features include cursor selection of documents to be edited from a menu, a scan feature to preview documents without opening them for editing and an on-screen paper tape to display visually results of the calculator icon.

Like the previous version, the new version of Office runs on the IBM Personal Computer, Personal Computer XT and Personal Computer AT with 256K bytes of main memory and a color or monochrome monitor. The program may be copied onto a hard disk.

The enhanced version of Office costs $79.95. Current users may upgrade for $10.

Applied Microsystems, P.O. Box 832, Roswell, Ga. 30077.

■ **STSC, Inc. has announced that its APL Plus UNX System for APL applications development is available for an IBM Personal Computer AT running Microsoft Corp. Xenix.**

The product requires the AT with a minimum of 1M byte of memory. The Xenix version is said to incorporate all the multiuser capabilities of the APL Plus UNX System that runs on larger computers. Features include concurrent file sharing and updating, multiple function and variable full screen editing and partial compilation of APL code.

The software includes an external process interface for access to non-APL programs, such as data base management systems and graphics. Nested arrays, compatible with IBM APL2, provide for APL arrays of greater than 64K bytes.

The price of the APL Plus UNX System is $995.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

■ **Matchware Computer Services has introduced a software selection package for the IBM Personal Computer and compatible machines.**

Known as Matchware, the diskette software was designed to assist small business users with the selection of accounting and vertical-market software.

The Matchware system poses a series of questions to users about features desired in a software product. Requirements are weighed by importance and compared to a group of products listed in the Matchware's data base.

A list of products that meet a user's requirement are generated in a printed report.

Matchware Level II allows the user to choose five of 10 application areas, including accounts payable, accounts receivable, billing, general ledger, inventory control, job costing, payroll, purchasing, sales order entry and client time and billing, the vendor said.

The Matchware package costs $795.

Matchware Computer Services, Suite 125, 6435 Castleway Drive, Indianapolis, Ind. 46250.

■ **Relational Database Systems, Inc. has announced a query language that works with Cobol applications developed on the AT&T Unix operating systems.**

Informix-ESQL/Cobol is based on IBM SQL and reportedly enables Cobol programmers to embed SQL statements in programs. The software can be used to create, maintain and query data bases and to integrate Cobol programs with existing data bases created by the Informix-SQL data base management system.

Informix-ESQL/Cobol requires a minimum of 512K bytes of memory, and 1M byte is recommended for multiuser systems.

Prices start at $749, the vendor said.

Relational Database Systems, 4100 Bohannon Drive, Menlo Park, Calif. 94025.

■ **Concentric Data Systems, Inc. has announced a report writer for use with Ashton-Tate's Dbase II and Dbase III micro software packages.**

DB Report Writer is said to enable preparation of reports from any Dbase file. It allows flexible formatting with page sizes up to 250 printer columns by 112 lines. Reports are printed exactly as they appear on the user's screen, and report definitions can be saved or modified for future use. The program features plain English query with AND and OR commands, full selection rules and parenthesization. It allows up to four sort levels with subtotals, averages and counts.

DB Report Writer operates on the IBM Personal Computer, Personal Computer XT, AT and compatible personal computers with a minimum of 256K bytes of memory, the ability to read a 360K-byte program disk and PC-DOS 2 or later.

The cost is $125 including an online Help system, a user's guide with tutorial and a support hot line. A $99 introductory price is being offered through Dec. 25.

Concentric, 18 Lyman St., Westboro, Mass. 01581.

■ **Multi Mini Programs, Inc. has announced a software program for calculating compound interest that runs on Microsoft Corp. MS-DOS-based personal computers.**

Loanshark produces amortization schedules of up to 100 trillion dollars to the nearest cent, without error or adjustment in the final payment. It requires a 320K-byte drive and a minimum 128K-byte memory.

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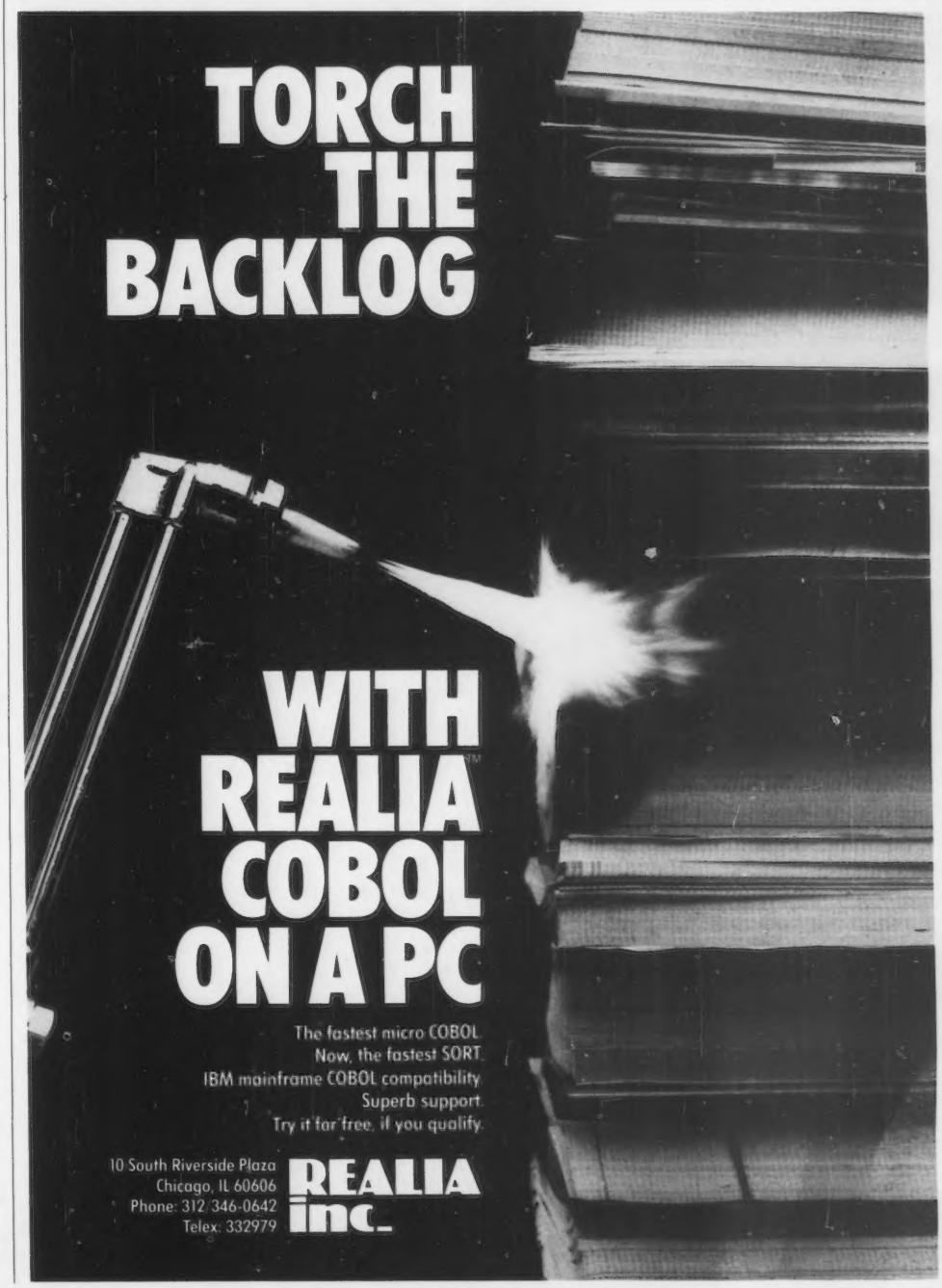

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The best of both worlds.

For owners of IBM Personal Computers, combining personal productivity and business applications is now less of a leap than ever before.

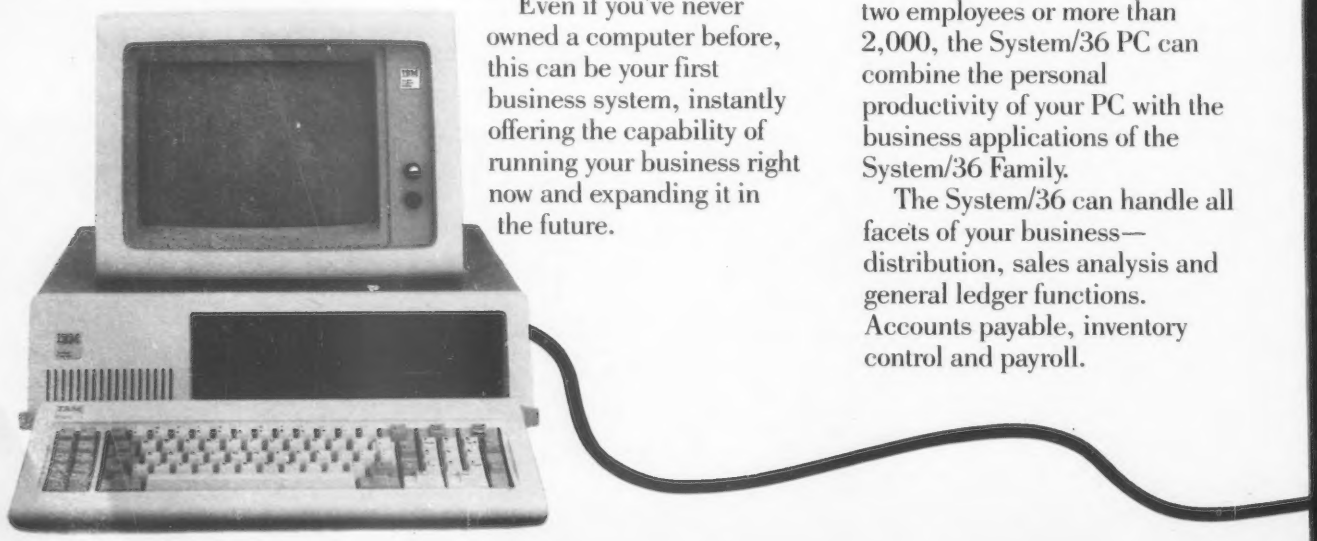
There's a new IBM product that marries the IBM System/36 and the IBM Personal Computer to give you the best of both worlds.

Meet the newest member of the System/36 Family.

It's called the IBM System/36 PC.

Very small but it opens up new worlds for your personal computer. Very affordable with a price starting at $5,995, yet capable of running System/36 programs that will help you run your business.

Even if you've never owned a computer before, this can be your first business system, instantly offering the capability of running your business right now and expanding it in the future.



Multiuser system.

System/36 PC can be a standalone computer for small companies or a departmental system or even part of a distributed network for larger companies, providing multiuser access to data.

The System/36 PC is made up of a 5364 Processor attached to an IBM PC, PC XT or PC AT. And you can connect up to three more of these personal computers. Or you can connect terminals such as System/36 printers or displays.

Flexibility.

Whether your business has two employees or more than 2,000, the System/36 PC can combine the personal productivity of your PC with the business applications of the System/36 Family.

The System/36 can handle all facets of your business—distribution, sales analysis and general ledger functions. Accounts payable, inventory control and payroll.

IBM System/36 PC.

And you can get traditional PC functions such as spreadsheets and word processing.

Software for the System/36 has been developed over the years and has proven invaluable in all kinds of businesses of all sizes. And with the thousands of programs written for both IBM PC and System/36, the sky's the limit for business and planning applications.

The System/36 PC even provides you with data security features so that the right data gets into the right hands.

Small yet powerful.

All of this processing power can sit right on a desk or under it—either horizontally or vertically. It measures a mere 21¼"x16¾" x6½"—about the size of a small suitcase.

Yet as small as it is, this little box has multiple processors, with main memory that can be dedicated to running your business functions. In plain English, this means you can get better response time. The System/36 PC comes with a 1.2 MB diskette drive and either 40 or 80 MB disk storage, depending on your information storage needs.

Easy to use.

The System/36 PC is easy to learn and to use. If you need assistance, it has over 2,800 "help" screens that take you step-by-step through any rough spots. You can merge data you've generated on your PC with information that's on your System/36 PC. And you can share information that is stored in the System/36 PC with other attached IBM Personal Computers or System/36 terminals.

Compatibility is high so that you can keep on using many of the PC peripherals and programs you may already own.

Easy growth.

What happens when your small office becomes bigger?

That's what the System/36 Family is all about. No matter what size your business, there's a member of the System/36 Family that can help you do whatever you do, better.

As your needs become greater, there's the mid-sized 5362 processor that offers greater performance and can handle up to 22 personal computers or System/36 terminals.

Then there's the original System/36—the 5360 processor—the largest member of the System/36 Family, which can handle up to 36 personal computers or System/36 terminals.

Any one of these processors can function as the central processor in your office. Each can communicate with PCs or larger systems, giving communication and connectivity new meaning by allowing departments to share data.

So if your dreams are big but your office is small, the new System/36 PC is the perfect step for you to take. You not only get the best of both worlds, you also get IBM product reliability. And authorized IBM on-site service is available anywhere in the U.S.A.

For a free brochure on the IBM System/36 PC or for information on product availability from participating IBM Product Centers, Authorized PC Dealers or Value Added Dealers, call 1 800 IBM-2468, ext. 90, LL. Or call your IBM marketing representative.

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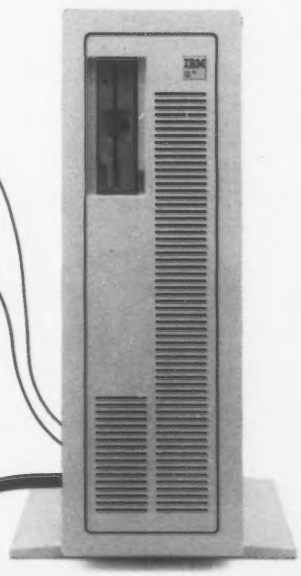

MICROCOMPUTERS

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The cost for Loanshark is $100. Additional uses, updates, revisions and additions to the program are available for a handling fee of $25.

Multi Mini Programs, P.O. Box 6067, Linglestown, Pa. 17112.

■ **Computer Systems Research, Inc. has announced a computer-aided instruction system designed to allow the development, presentation and administration of self-study courses on the IBM Personal Computer, Personal Computer XT and AT.**

CSR Trainer 4000 is composed of an authoring system used to develop courses, an administrative system to track and report student progress and a presentation system that presents the courses to the student. The package has a sound editor and a graphics editor, and it enables interactive videodisk and videotape support, according to the vendor.

Screen colors can be defined, and text can be displayed in 40- or 80-char. mode. Data on up to 50 students registered for as many as 15 courses each can be stored and reported.

The system requires a minimum of 256K bytes of memory. Courses can be uploaded to and downloaded from IBM mainframe computers that use IBM's Interactive Instructional Authoring System and Interactive Instructional Presentation Systems.

The CSR Trainer 4000 is priced at $1,820.

Computer Systems Research, 40 Darling Drive, Avon, Conn. 06001.

■ **Master Class Corp. has announced a runtime version of its AT&T Unix-based authoring system, Cast, for users of Microsoft Corp.'s MS-DOS.**

Cast is a software tool said to enable the development of interactive computer-based training. The MS-DOS release enables courseware developed under the Unix version to be transferred without modification to any MS-DOS environment having a minimum of 128K bytes of internal memory.

The cost for Cast's MS-DOS runtime version is $100.

Master Class, 1721 Black River Blvd., Rome, N.Y. 13440.

■ **Reference Software, Inc. has announced that its Reference Set software package is now available for use with Microsoft Corp.'s Word software package for IBM Personal Computers and compatibles.**

Reference Set reportedly provides writers with access to Random House, Inc.'s *Random House Dictionary* and *Random House Thesaurus*, allowing the user to check spelling, find synonyms and change text without having to exit or save files.

Reference Set for use with Microsoft Word runs on the IBM Personal Computer, Personal Computer XT and AT and requires PC-DOS or MS-DOS Version 2 or later and two floppy disk drives or a hard disk drive.

Reference Set is available for $89.95.

The dictionary or thesaurus can be purchased separately for $69.95.

Reference Software, 2363 Boulevard Circle, Walnut Creek, Calif. 94595.

■ **Knight-Ridder Software, a division of Knight-Ridder Newspapers, Inc., has announced Hewlett-Packard Co. HP 2648 and 2623 graphics terminal emulation software for the IBM Personal Computer, Personal Computer XT, AT and compatible processors.**

The package, known as Picture Link, reportedly supports HP 2648 graphics modes including zoom and rubber band line. In addition, users reportedly can configure personal computers to include a graphics printer.

A minimum hardware configuration consists of a Hercules, Inc. monochrome graphics board and 256K bytes of random-access memory (RAM). Communications require either an asynchronous communications adapter and cable to the host or an internal modem and phone line. For color support, the Sigma Information Systems, Inc. Color 400 board, Princeton Software Co. Graphics SR12 monitor and 512K bytes of RAM are needed, the vendor said.

Picture Link costs $400.

Knight-Ridder Software, 25 Hudson St., New York, N.Y. 10013.

■ **Prentice-Hall, Inc. is offering a full implementation of the mainframe high-level programming language, Snobol4, for IBM Personal Computer and MS-DOS-compatible micros.**

Called Snobol4+, the compiler is said to operate on all Intel Corp. 8086-, 8088-, 80186- and 80286-based computers with a minimum of 128K bytes of random-access memory. Written in assembly language, Snobol4+ compiles source programs at a rate of 900 to 1,500 line/min.

The compiler also supports a hybrid memory model that reportedly provides up to 320K bytes of user program and data memory.

Snobol4+ costs $95.

Prentice-Hall, Business and Professional Division, Rt. 9W, Englewood Cliffs, N.J. 07632.

■ **Woolf Software Systems, Inc. has released Version 4 of Move-It, a communications package for microcomputer users.**

Version 4 adds automatic file compression, keyboard macros, scripting files, multiple Xmodem protocol support, in-filter and out-filter commands and the ability to send and receive files automatically.

The system is said to automate the communications session, including setting start time, log-in sequence and exception processing.

Priced at $150, Move-It Version 4 runs on most micros running PC-DOS, Concurrent DOS, Digital Research, Inc.'s CP/M 86 and Microsoft Corp.'s MS-DOS.

Woolf Software Systems, 6754 Eton Ave., Canoga Park, Calif. 91303.

■ **Intermedia, Inc. has introduced a software security program that requires users to enter a correct identification code and special password before gaining access to a personal computer.**

Called PC-Lock, the program operates on any IBM-compatible Microsoft Corp. MS-DOS system running Version 3.1 or lower and costs $19.95.

Intermedia, 1077 Celestial St., Cincinnati, Ohio 45202.

■ **Union National Bank/Noosphere Software Co. is offering Inventory, a micro program said to help purchasing agents keep track of expendable items in supplies inventories.**

Inventory maintains the quantity-on-hand and first-in, first-out value of each inventory item. Graphs of monthly use can be viewed to pinpoint slower moving items and adjust reorder points, a spokesman said.

The program provides three data bases: inventory, past transactions and vendor. Other features include on-order, reorder and user-defined fields; five reports that can be sorted on any of

Continued on page 59

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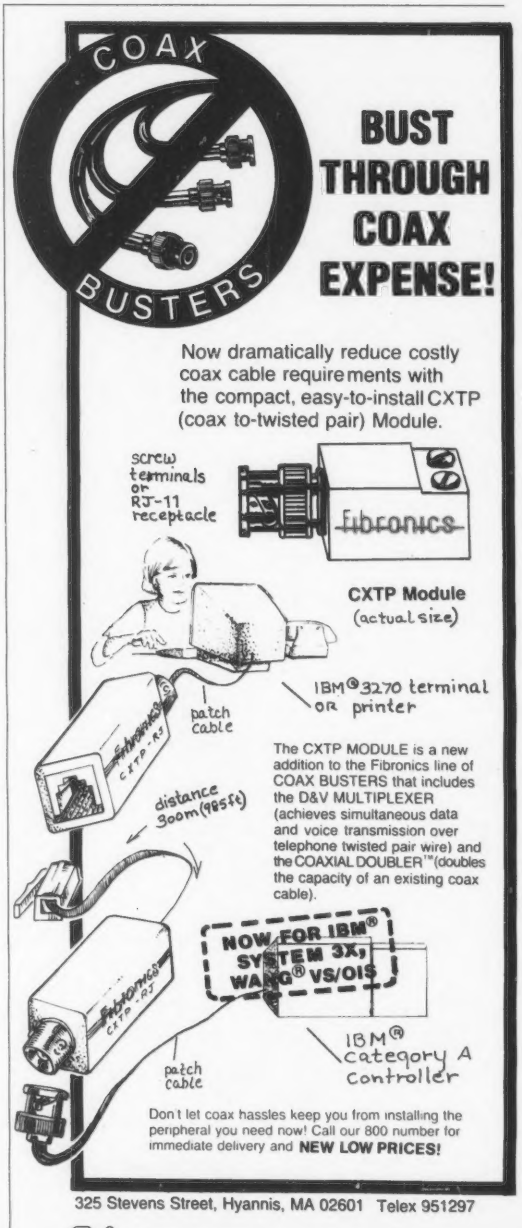

Continued from page 58

10 fields; and an audit trail made up of vouchers printed for every transaction.

Priced at $495, Inventory runs on the IBM Personal Computer and Personal Computer XT and AT and compatible processors with 128K bytes of random-access memory and DOS 2 or higher.

Union National Bank/Noosphere Software, P.O. Box 1541, Little Rock, Ark. 72203.

■ **The MacNeal-Schwendler Corp. has unwrapped MSC/Mate, a program that reportedly allows IBM Personal Computer XT and AT users to solve matrix-oriented mathematical problems.**

Matrices can be created and modified with a full screen, spreadsheet-like matrix editor. A programming language with a program editor lets users develop algorithms so problems can be set up once and solved for many sets of data, according to the vendor.

Menu-driven MSC/Mate contains a library of mathematical functions and a library of linear algebra routines for solving linear systems, extraction of eigenvalues and eigenvectors and calculating determinants and inverses of matrices.

The program handles up to 100 defined matrices, 100 scalar variables, matrices of up to 200 rows by 200 columns and program command files containing up to 735 lines.

Priced at $495, MSC/Mate requires Microsoft Corp.'s MS-DOS 2.1 or higher, 512K bytes of random-access memory, a color graphics card, one hard disk and one floppy disk drive and an Intel Corp. 8087 or 80287 math coprocessor.

MacNeal-Schwendler, 815 Colorado Blvd., Los Angeles, Calif. 90041.

■ **Intex Solutions, Inc. has enhanced X-Y-Z, a package that consolidates and compares multiple data sheets, making it compatible with all versions of Lotus Development Corp.'s Symphony and 1-2-3.**

X-Y-Z Version 2 can consolidate or compare files from Versions 1A and 2 of 1-2-3 and Versions 1 and 1.1 of Symphony. The software also can consolidate any combination of 1-2-3 and Symphony files, even if they are of different formats, the vendor claimed.

Upgrading products shipped prior to Sept. 16 costs $60. Otherwise, Version 2 is priced at $145 for the 12-worksheet version and $395 for the 255-worksheet version.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

■ **Universal Intergraphix Corp. has released Version 3.4 of 3-D Graphixx, a three-dimensional graphics package for microcomputers running IBM's PC-DOS 3 operating system.**

Version 3.4 enhancements include an on-line Help facility; step and repeat with an automatic-execute mode; ability to learn, step and repeat a process; parabolic cubic splines; bisectors and autobisector connection; snap to point or line; automatic X-, Y- or Z-axis distortion; and 32 windows for viewing a drawing.

Other features are entity clip, flat or curved surfacing, ability to interface Ascii word processing text to Graphixx output, angled dimensioning and animation of dynamic layers with static layers.

The program requires 640K bytes of random-access memory, a clock calendar, a 10M-byte hard disk, a math coprocessor, two serial or one parallel communications port, a Microsoft Corp. bus-compatible mouse, a graphics adapter and a color or dual-mode monochrome monitor.

Version 3.4 of 3-D Graphixx $2,995 for PC-DOS 2 and $3,995 for PC-DOS 3.

Universal Intergraphix, Suite 108, 2990 E. G St., Ontario, Calif. 91764.

■ **Software West, Inc. has unwrapped an upgraded version of its RPG-II compiler that runs on the IBM Personal Computer line.**

The enhanced compiler is said to provide RPG language implementation based on IBM's System/34 RPG-II; sequential, direct and Isam file processing; ability to link to user-coded assembly language routines; and a disk sort/merge utility.

Priced at $1,500, the compiler runs on a minimum of 128K bytes of memory under IBM's PC-DOS 2 or higher.

Software West, P.O. Box 2276, 637 S. Wrightwood St., Orange, Calif. 92669.

■ **Electrohome Ltd. has developed software that adds videotex capability to Apple Computer, Inc. Macintosh computers.**

Called MACNAPLPS, the package allows the Macintosh to function as a videotex decoder without loss of picture information, even though it operates in two colors and MACNAPLPS works with a color format, a spokesman claimed.

Providing 512- by 322-pixel resolution, MACNAPLPS preserves color information by using dither patterns. It allows users to store and retrieve downloaded slides locally in the Macintosh and modify these slides locally using Macwrite, Macpaint and other Macintosh application programs.

Other features include a local charting function for creating business presentation slides, the ability to use Macintosh fonts for slides pull-down menus for setting up communications and selecting and operating on screen keypads using the mouse.

MACNAPLPS comes on a 3½-in. diskette and sells for $99.

Electrohome, 809 Wellington St. N., Kitchener, Ont., Canada N2G 4J6.

Continued on page 62

...if Phil in Accounting needs information on page 63, item 178 and so does Ted...

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NEW YORK GENEVA SYDNEY

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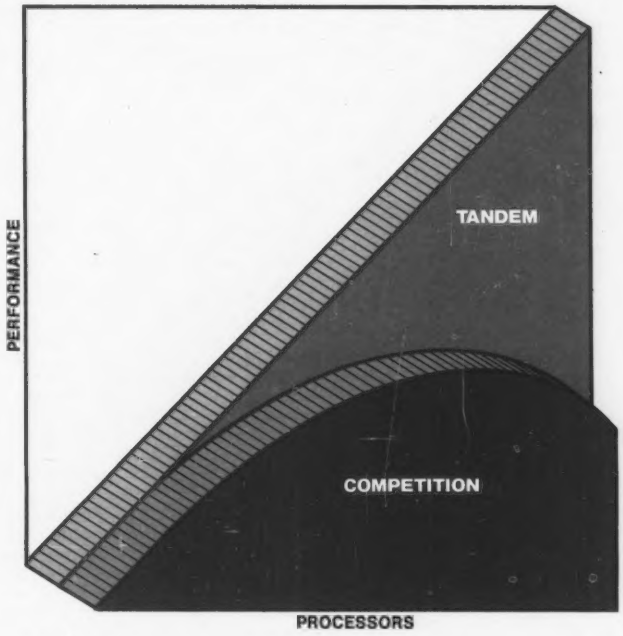
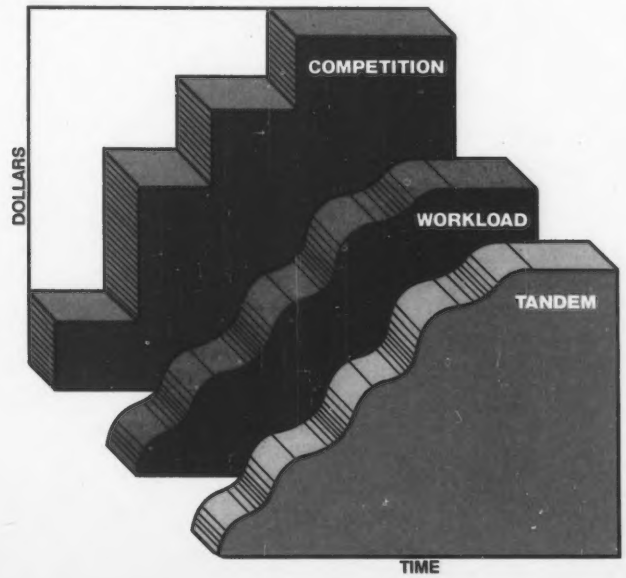
WHAT IT COSTS.

The performance cost. With conventional computer architecture, doubling your processors does not double your performance. With Tandem, each incremental increase in processing power provides matching performance.



The dollar cost. With conventional computer architecture, growth is convulsive. You must continually over-invest to assure sufficient processing power. With Tandem, growth matches need. You never invest more than you have to.



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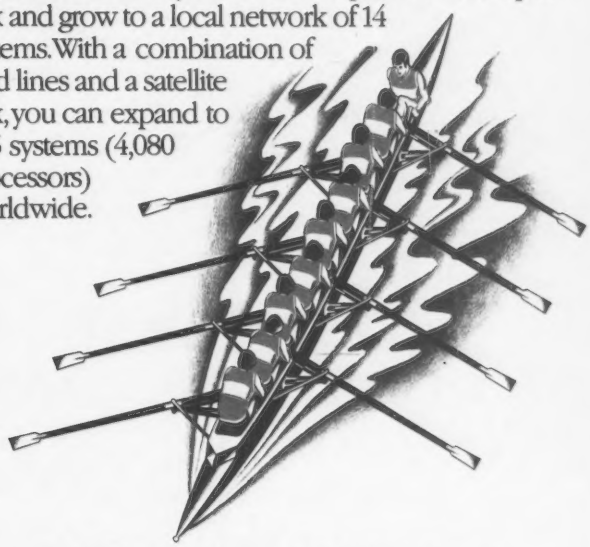

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TANDEMCOMPUTERS

From page 59

Software

■ Westford Systems, Inc. has enhanced Micro-Track, a computer usage recording and reporting package for the IBM Personal Computer line.

Version 2 enhancements feature the ability to include summary dollar totals for computer usage billing, the ability to report by account code and optional automatic account code entry during logon, according to the vendor.

Micro-Track runs under PC-DOS and requires 96K bytes of memory. A single system license costs $59.95. Site licenses are available at $295 for 10 systems, $995 for 100 systems and $1,695 for 1,000 systems.

Westford Systems, P.O. Box 26, Still River, Mass. 01467.

■ Decision Graphics, Inc. has offered a program that lets users create, edit, save, retrieve and plot text slides in multiple fonts.

The software, DGI Type Shop, is compatible with these plotters: Hewlett-Packard Co. HP 7220A, HP 7475A, HP 7550A and HP-GL; Enter Computer, Inc. Six Shooter; Gould, Inc.; IBM 7371 and 7372; Nicolet Instrument Corp.; and Roland DG DXY-880.

DGI Type Shop offers the ability to plot across the width or length of a page; set full or manual page size, automatic or manual letter size and starting location; plot on paper or transparencies; and set justification.

Priced at $175, DGI Type Shop comes with six type styles. Additional fonts are available at $25 each.

Decision Graphics, P.O. Box 2776, Littleton, Colo. 80161.

■ Prophecy Development Corp. has unwrapped Profit Tool, software that runs on a number of microcomputers and automates the telemarketing process.

Profit Tool is said to produce sales presentations, research surveys and telemarketing dialogues based on user inputs prompted by data entry forms. The software also manages client phone files and comes with an automatic dialer that can dial numbers from the client data base.

In addition, Profit Tool compiles and profiles telemarketing data collected by the user. Tabulate, list and compare functions help create target data bases for mailings and follow-up phone calls, according to a spokesman.

The package runs on the IBM Personal Computer and compatibles, Wang Laboratories, Inc.'s Professional, Data General Corp.'s Data General/One, and Apple Computer, Inc.'s Macintosh.

Profit Tool costs $1,995 for a single-user license.

Prophecy Development, 308 Boylston St., Boston, Mass. 02116.

■ Software for accessing real-time security market data with a personal computer and linking it to a host is available from Monchik-Weber.

Called PC Passthru, the package allows an IBM Personal Computer to receive information from the vendor's real-time market broadcast system, Ticker III, which contains securities data from international exchanges. Users can format data on any combination of stocks, options, bonds or futures, the vendor claimed.

A data base resident in personal computer memory is said to allow a host mainframe to rebuild its pricing data base in the event of data loss.

With PC Passthru, the vendor supplies an IBM Personal Computer, software and its Pricelink coprocessor that reads Ticker III data via satellite or leased lines.

For IBM mainframes, a Digital Communications Associates, Inc. Irma board in the personal computer emulates an IBM 3278 terminal. PC Passthru uses an asynchronous interface for other host computers.

PC Passthru licenses for $15,000 plus hardware and communications charges and monthly fees.

Monchik-Weber, 11 Broadway, New York, N.Y. 10004.

■ A word processing package that runs on the IBM Personal Computer line and requires no codes or complex keystroke sequences is available from Lexitronics, Inc.

The package, known as Lexitype, presents text on the screen as it will appear on hard copy, duplicating margins, spacing, centering and underscoring.

Most functions are invoked by pressing one labeled key, like Space Bar, Backspace, Return and Underscore, which work as they do on a typewriter, according to the vendor.

Lexitype, which is fully compatible with the Lexitron/Raytheon Data Systems Co. dedicated word processor, includes a spelling checker and corrector and an import/export function said to permit Lexitype to exchange information with other software packages.

An optional utility package allows documents to be transferred from Lexitron to Lexitype without rekeying or cleanup, the vendor claimed.

Minimum requirements are at least 256K bytes of memory and one diskette drive. Lexitype retails for $595. A demo package is available for $5.

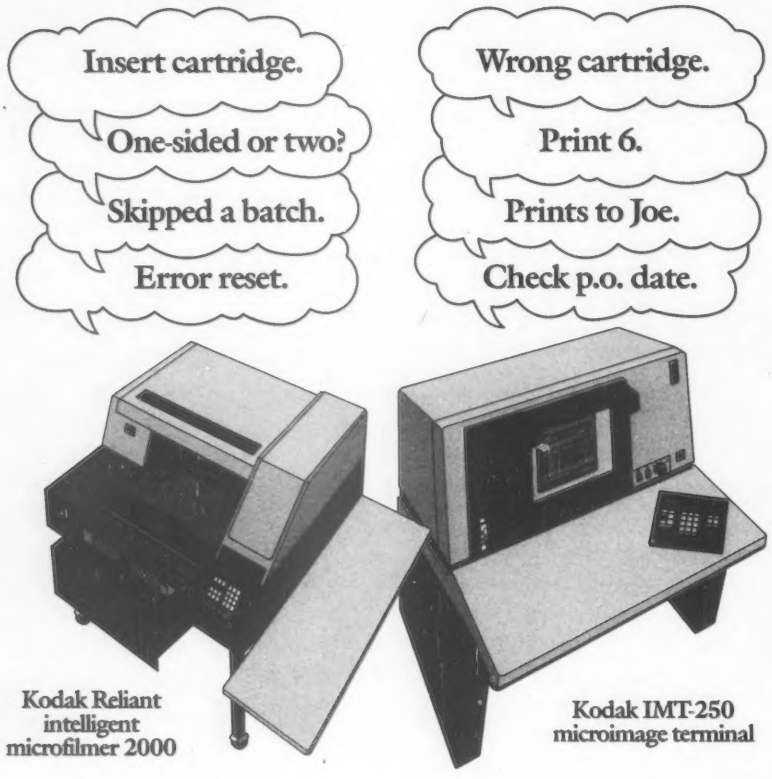
Lexitronics, Suite 14, 101 E. Holly Ave., Sterling, Va. 22170.

■ Reference Technology, Inc. has announced Clasix STA/F Text, an optical information delivery system that reportedly gives mainframe-level text search capability to IBM Personal Computers and compatible processors running IBM's PC-DOS.

The software supplies personal computers with the ability to retrieve textual information, such as large text data bases, stored on read-only optical disks in any format and

Continued on page 63

Kodak presents intelligent conversation.



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From page 53

CD-ROMs eye big payoffs

it very easy to buy from the 65,000 books Ingram offers.

"Libraries are really at the forefront of commercial applications of CD-ROMs on any wide scale," according to Larry Price, Ingram's marketing manager for libraries. "You can get information that is very difficult to get to otherwise." Currently, many tasks require librarians to either wade through paper, which is primitive, or go on-line, which is expensive, he said.

While suppliers of on-line data bases such as Mead Data Central clearly are examining potential roles for CD-ROMs, particularly for nonvolatile data, the industry is busily grappling with pricing questions.

CD-ROMs are likely to find a role more quickly in private than in public data base distribution, said Edward Schmid, Digital Equipment Corp.'s market development manager for CD products.

In most private applications, "the customers are the owners of the information, and they can manage a project for implementing the technology," he said. Public data base distribution "takes the collective efforts of many groups."

> ❞
>
> *As a rule of thumb, optical disks make economic sense for distributing information to groups exceeding 50 people.*

DEC, the first major computer vendor to offer a CD-ROM subsystem, began selling the device for use with its Microvax II in July. Schmid predicted that five to 10 turnkey applications will surface among customers by year end, including sending out catalog information, documenting equipment for insurance purposes (with textual and pictorial descriptions) and offering technical data bases.

DEC's own field service group is putting information about 80 products on CD-ROM disks, and the supplier also is examining other potential applications such as storing sales information. As a rule of thumb, Schmid suggested, optical disks currently make economic sense for distributing information to groups exceeding 50 people.

"There's tremendous potential for in-house production as an alternative to microfiche for a report or a data base distributed internally," commented Wil Zachmann of International Data Corp., a Framingham, Mass.-based market research firm. He noted that CD-ROMs may provide a good route for micro-to-mainframe data access.

While high-volume magnetic disk drives and write-once optical storage systems also will be available next year, "in a lot of applications you don't want to be able to destroy the data," remarked Anne Armstrong, managing editor of "CD Data Report" in McLean, Va. Among these applications she mentioned insurance records, banking information and stock part lists.

CD-ROMs also may carve out a niche in software delivery. "Theoretically you don't need backup copies" because the disks are so robust, Armstrong noted. "It's possible that CD-ROM could solve some of the piracy problems," she added, although like others she is doubtful that any scheme is proof against hackers.

One challenge the industry must overcome is figuring ways to handle all that information. The task of defining and retrieving what you want "becomes finding a needle in a haystack," Armstrong stressed.

"With such large files, you'll get a limited use of this technology until software, particularly artificial intelligence software, evolves to deal with a random walk through a body of knowledge," suggested Alan Hald, chairman of Microage Computer Stores, Inc. "People need a novice system — a system that will help them isolate the question," Hald said. Once past that barrier, he forecast "tremendous applications, particularly in the area of training."

Continued from page 62

of any size, the vendor claimed.

Menu-driven STA/F Text is said to maintain index information and the location of each word in a document so users can search for text based only on words used in the target document.

The vendor also has added a service to its Clasix Data Services that produces an index to words in a STA/F Key text data base and allows information to be converted into optical disk format for master disk production and replication.

STA/F Text is priced at $395. The Clasix Data Service to produce STA/F Text indexes costs $1,500 plus $35 per megabyte of memory and an initial index and screen layout definition fee of $1,500.

Reference Technology, 1832 N. 55th St., Boulder, Colo. 80301.

■ **Advanced Logic Systems, Inc. has announced a spelling checker for the Apple Computer, Inc. Appleworks word processor.**

Called Spellworks, the spelling checker contains approximately 90,000 words on one diskette and will check 10 words per second on the Appleworks word processing program for Apple IIe and IIc micros. Spellworks reportedly will allow Appleworks' data base to merge with the word processor.

Spellworks sells for $49.95.

Advanced Logic Systems, 1195 Arques Ave., Sunnyvale, Calif. 94086.

■ **United Software Security, Inc. has unveiled a hard-disk backup system for the IBM Personal Computer, Personal Computer XT, AT and compatible computers plus most IBM-compatible local-area networks running PC-DOS 2 or higher.**

The system, known as Taketwo, provides users with screen displays for setting up parameters for backup. This configuration information includes which files and directories to back up, how often backups should occur and how many days of old file versions to retain.

Continued on page 66

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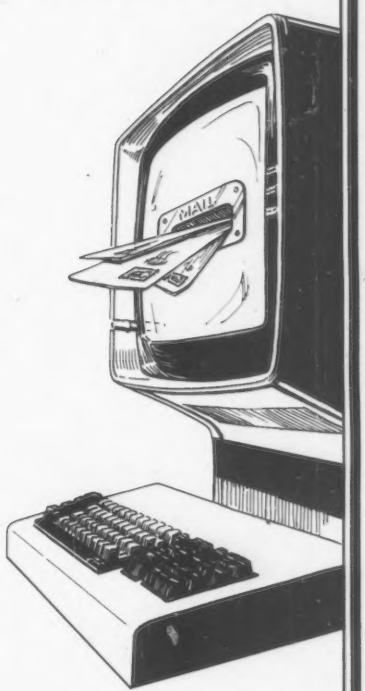

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Software AG Users spell it out...Datapro™ survey rates ADABAS

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CW1007

Datapro is a registered trademark of Datapro Research Corporation.

Continued from page 63

Taketwo automatically formats backup floppy disks, indicates which and how many backup floppies to insert and shows how long the backup will take along with backup status information while it is under way, the vendor explained.

Restore functions operate for single files, single directories or entire hard disks.

Taketwo costs $16,125 for a perpetual corporate license for an unlimited number of copies of the software. Other licenses are available.

United Software Security, Suite 100, 6867 Elm St., McLean, Va. 22101.

■ **Omtool Corp. has enhanced its Dibol-compatible Softbol compiler for microcomputers running under Digital Research, Inc.'s CP/M 86, Microsoft Corp.'s MS-DOS and Xenix, AT&T's Unix or Unix look-alike operating systems.**

Version 2.1 has also increased runtime processing speed by between 40% and 200%, depending on the operation.

In addition, the sort utility in Version 2.1 can sort 5,000 records in 1 minute, 37 seconds. Previously, this task took 36 minutes, 51 seconds, a spokesman claimed.

Softbol is said to permit Dibol programs written for Digital Equipment Corp. minicomputers to run on microcomputers without changing the applications.

A development system costs $625. Prices for runtime systems range from $240 to $750.

Omtool, P.O. Box 477, Tewksbury, Mass. 01876.

From page 57

Consultant's micros blur lines between jobs

slips going back and forth."

However, a professional who types "is not always a help to the secretaries," according to Linda Austin, secretarial coordinator for one ADL group. One consultant had to be told to capitalize the first word of every sentence and put two spaces after each period.

"It was more work for me to go in and fix all that than to sit and retype 20 pages," she noted.

Another staff member "came in one night and went through all his secretary's diskettes and reorganized everything," Austin said. "Then the next day he expected her to get out a final report, and she didn't know where anything was." Professionals "have to live by the same set of rules we've been living by," she added.

Some successful applications bring new difficulties in their wake, pointed out consultant Scott Stricoff. In one case, he said, he can talk with a client on the telephone and make changes in a draft document himself rather than mark up a piece of paper and hand it to a secretary. "I can now directly effect the final product and eliminate an intermediate step."

Unfortunately, "the efficiency of my secretary in keeping track of all this stuff — keeping files straight, keeping archival copies — is gone," Stricoff said. "And I'm terrible at that. That's the biggest problem we have."

Using personal computers for financial analysis, the creation of presentation graphics or other tasks also may complicate life for support staff.

Some professionals have "unbelievable expectations" for their secretaries, according to Ann Laynor, an information systems consultant. "If they are doing [Lotus Development Corp.] spreadsheets at home and she's come out of a three-day word processing training class, she is supposed to be able to print out that Lotus spreadsheet. That, to me, is like playing Beethoven's Ninth after three hours on a piano."

"When a professional who knows 1-2-3 expects his secretary to learn it overnight by doing nothing but having it sit on her desk, we get into all sorts of problems," Stricoff agreed.

The flip side

The flip side of this issue is that support staff may be trained in 1-2-3 or other packages, "and then they may come back and never have the time to do it because the proposals and reports come first," Austin said.

With many consultants in his group equipped with personal computers, "the secretarial workload in terms of traditional tasks has really declined," Stricoff said. "Now a secretary with an assignment of three professionals is not nearly as pressed." Over the next few years, he said, the company either will end up with fewer secretaries or will redefine their jobs.

Micros also have helped to boost the role of research assistants, who "are spending most of their time spreadsheeting and preparing presentation graphics," Hagedorn said. "These four-year graduates can do many of the analytic things that you couldn't do unless you had an MBA or equivalent before because you had to understand more of the math and other methodologies. Now all you've got to know is a bunch of dumb computer commands."

Taking a broader view, Hagedorn predicted that micros will help cut down on layers of management in U.S. offices and factories.

From page 53

Orchid board announced

tional memory and expanded memory. Conquest also features disk caching, a random-access memory (RAM) disk utility for expanded memory and print spooling software.

Conquest is available installed without RAM and 2M-byte capacity for a cost of $395.

There is also a nine-chip set of 256K-byte RAM available for a cost of $95.

Micros:
The big picture.

In November's
Computerworld Focus,
we put micros
under the scope.

Since the last year has been so wild and unpredictable, we're not only going to take a look at microcomputer hardware in our November 20th issue, but we're also going to broaden our view to try to get a handle on the micro market in general.

We'll have a special section on hardware—what's available and what's expected to come. And the changing relationship of micros and the 3270 terminal.

We'll also dissect the entire industry—one aspect at a time. Among user companies, we'll tell you who's buying and who's *not* buying—and why. And look at the reasons in great depth.

Then we'll dig deep into the industry shakeout. Discover who's got the edge and who doesn't. Who's expected to survive. And how that will mold the future.

We'll see how the slowdown is affecting the way user organizations are planning. Whether they're simply making do with what they've got until the shakeout is over. Or if they've actually satisfied their needs.

But that's not all. We'll also take a look at how communications and networking are coming along. And the developing trends in printer technology including the laser printers. And what's happening in the portables and lap size micros.

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COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

Ad campaigns miss the mark

OK. We can giggle at AT&T and the divested Bell operating companies for advertising high-speed digital communications services and operating systems in the popular media. The apparent marketing blunder is funny and forgivable, the poor, confused monoliths.

But it's catching.

Normally rational companies are now hawking things on television like optimized IBM Systems Network Architecture (SNA) networking and memory disks to hapless millions who do not have the foggiest idea what these things are and why they may be important — and probably never will.

Pity the uninitiated.

Centrex advertisements on television. What's that? New England Telephone Co. is advertising it in the evening. Should I trade in my Princess phone and upgrade? Reliability is a big feature. I can use my phone even if the power fails, the company claimed. Actually, I thought I could do that with my current black tabletop rotary phone.

And maybe when I'm having Centrex installed I'll inquire about the 56K bit/sec. data service they're advertising. It sounds advanced, even though I'm not sure I need it. What's a bit, and how can you get so many into a single second? After all, a second is a measure of time, not a measuring cup. They say it's digital. Does that mean it's displayed numerically like on my watch? I'm wondering, too, if I'm "getting

Continued on page 77

Installed systems make 'box' converters viable

By Bob Albright
Special to CW‡

Rumors of the death of the stand-alone protocol converter market have been greatly exaggerated. While demand for the devices will decline as converters are built into new computers, box-type converters will still fill a need for some time to come.

Stand-alone converters, for example, are needed to serve existing equipment. Millions of IBM 3270-type terminals exist that still require protocol converters to switch from synchronous to asynchronous data transmission. Additionally, personal computer users need converters to switch into different protocol environments.

While terminal emulation boards encroach on the demand for stand-alone converters, the box-type converters offer greater flexibility. Terminal emulation boards meet the specific needs of personal computer users who require something more than a way to convert asynchronous Ascii to a synchronous protocol.

But board manufacturers cannot build a board for every system; market needs are too wide to make it profitable. In addition, not all existing personal computers will accept emulation boards. Stand-alone converters, on the other hand, can be connected to the back of a micro and then later used with another type of device.

Continued on page 77

Albright is a product manager with Black Box Corp., a mail order communications equipment supplier in Pittsburgh.

Sequel switch eases extension

Sequel Data Communications, Inc. of Cary, N.C., recently unveiled a data switch that can be split in half, separated by up to 1½ miles and interconnected with two twisted-pair wires.

The Sequel switch supports from six to 192 asynchronous ports, each operating at a maximum of 19.2K bit/sec. It costs less than $100 per line at 30 ports, the company reported.

By splitting the switch in half, users in nearby buildings can be supported without requiring line drivers, modems or other devices normally needed to extend the reach of an RS-232 link. The switch halves are interconnected with two twisted-pair wires which, through time division multiplexing, support 96 concurrent circuit con-

Continued on page 76

NCR 3690s get link options

NCR Comten, Inc. of St. Paul, Minn., has broadened the link options available with its 3690 communications processor family to include two high-speed options.

The High-Speed Link Controller-Modem Interface Module (HLC-MIM) terminates 256K bit/sec. links in the 3690 communications processor. It replaces four Comten Data Link Controllers-Modem Interface Modules, each of which supported a 64K bit/sec. line. The HLC-MIM concurrently supports asynchronous, bisynchronous, IBM's Synchronous Data Link Control and Binary Synchronous Communications protocols, as well as X.25 High-Level Data Link Control.

NCR Comten said the HLC-MIM will be available in the first quarter of 1986 with

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■ Racal-Milgo has announced a series of diagnostic data service units, a fiber-optic multiplexer, encryption devices and enhancements to its network management systems/**68**

■ New from Wang Information Services is a text and data messaging service for customers with multiple locations or traveling employees/**69**

■ Western Union has reduced daytime rates for its Optimized Wats service by up to 10%/**72**

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Infotron Systems offers T1 net monitoring program

Infotron Systems Corp. has released a program that runs on the IBM Personal Computer AT and provides network monitoring and tracking for T1 lines.

The Cherry Hill, N.J., company's ANM1500 package can be used with up to eight T1 networks with 16 Infostream 1500 time-division multiplexers. The software provides dynamic monitoring of the networks, automatic alarm notification, real-time graphics, histograms that illustrate events and network utilization and trouble tickets.

ANM1500 lists types, numbers, physical names and logical names of attached devices; priority assignments of each channel; end-to-end channel assignments and nodes; and slot and channel numbers. The software can make configuration changes for any channel without interrupting system operation.

ANM1500's error reports consist of out-of-synchronization reports, number of frames lost and configuration of a node when an error occurred and total duration of an outage. Whenever an outage is longer than a user-set threshold, a trouble ticket is generated and a problem escalation feature goes into effect.

System diagnostic features include link loopback, channel loopback, read/write channel interface control status and read/write voice channel signaling bit status.

Event reports consist of logic status reports, configuration changes, attempted breach of security, reset network control, master clock source changes and time slot contentions.

The price of the network management package ranges from $5,000 to $7,000.

Comdesign unveils switch, modems and AS-1000 mux

Comdesign, Inc. of Goleta, Calif., has added a data switch, two modems and a multiplexer to its product line.

The CX2000 private branch exchange is a virtual circuit switch used to connect asynchronous devices to CPUs. The product fits in a 19-in. rack and holds 17-line cards, each with a maximum of 24 channels, for a total of 408 lines. The chassis supports two system-control cards or four cards for redundant control logic, circuit maintenance and switching. The CX2000 includes redundant power supply and backplane and a hot-spare backup.

The switch ranges in cost from $100 to $125 per line depending on configuration.

Modems introduced include 4.8K and 9.6K bit/sec. modems designed for point-to-point applications. The CM-4800 and CM-9600 support full-duplex operation over four-wire leased lines and half-duplex operation over two-wire dial-up circuits. The products are compatible with CCITT V.29 and V.27 standards. Eight front-panel displays provide operation and test status. Six push-button switches control the modems' diagnostic features.

The modems each cost $1,395.

The AS-1000 multiplexer is designed for airline companies that support the widely used Programmed Airline Reservation System protocol. Other protocols supported include asynchronous and IBM's Binary Synchronous Communications and Synchronous Data Link Control. Each node can support up to 16 input channels operating at speeds of up to 9.6K bit/sec.

A four-channel unit sells for $4,000.

Racal-Milgo tools announced

Racal-Milgo, Inc. of Sunrise, Fla., has announced a series of diagnostic data service units (DSU), a fiber-optic multiplexer, encryption devices and enhancements to its network management systems.

The DSU Remote Diagnostic 500 and 556 provide central-site and unattended remote-site diagnostics for digital communications facilities. The products support operations at speeds from 2,400 bit/sec. to 56K bit/sec. in point-to-point or polled multidrop networks.

In-band diagnostics include line and digital loopback, end-to-end testing, self-testing and antistreaming capabilities.

The units can be controlled by a terminal, minicomputer or network management system, the vendor said.

DSU Remote Diagnostic 500 is priced at $850, and the DSU Remote Diagnostic 556 is priced at $895.

The Omnimux 3200 is a time division multiplexer for local applications that supports transmission of asynchronous and synchronous data. It can accommodate up to 32 ports at channel rates of up to 64K bit/sec.

Without repeaters, the products operate at distances of up to six miles. An eight-channel model costs $5,390.

Datacryptor 64 uses the Data Encryption Standard algorithm and operates in single-bit cipher feedback mode for protocol-transparent operation. The device can work at speeds up to 64K bit/sec. with synchronous protocols and 19.2K bit/sec. in asynchronous networks.

The encryptor supports RS-232, V.11 and V.35 interfaces and sells for $1,900, according to Racal-Milgo.

VOICE/DATA COMMUNICATIONS

■ **Metapath, Inc. has introduced a 20-port data switch designed for a medium-size network.**

The DDS-20 supports up to 16 serial devices at speeds of up to 9.6K bit/sec. and four parallel devices at speeds of up to 40K bit/sec. DDS units networked with other units by coaxial cable can support up to 1,125 ports.

Prices for the DDS range from $1,500 to $3,300.

Metapath, 222 Lincoln Centre Drive, Foster City, Calif. 94404.

■ **Cohesive Network Corp. has announced that its T1 network nodes are compatible with AT&T Communications's Accunet T1.5 Service and Accunet Reserved 1.5 Service.**

The products were tested in May at AT&T's Bell Laboratories test center in Holmdel, N.J. The tests, which proved that Cohesive's D4 framing technique is compatible with Accunet, also demonstrated that Cohesive's equipment can receive synchronization from AT&T Digital Access and Cross-Connect system.

Cohesive Network, 1680 Dell Ave., Campbell, Calif. 95008.

■ **VMX, Inc. has added a Verbal Bulletin Board to its Voice Message Exchange system.**

The company's Verbal Message Exchange is available as a stand-alone package or can be integrated with a variety of private branch exchanges.

The Verbal Bulletin Board software package enables a company to provide a listing of information that can be accessed by a user with a Touch-Tone telephone. Employment opportunities, seminars, schedules and community events are a few examples of possible applications.

Customized voice prompts guide callers through the process of receiving a message. After receiving the information a caller can leave a message if he desires more information or a follow-up telephone call.

The Verbal Bulletin Board costs $7,000.

VMS, 1241 Columbia Drive, Richardson, Texas 75081.

■ **Southwestern Bell Mobile Systems, Inc. has implemented a cellular phone rental plan for the Dallas-Fort Worth area.**

The Southwestern Bell Mobil Systems Retail Division will rent the phones for $35 to $55 per month, depending on models. Rates include insurance and maintenance fees. If a customer wants to buy the phone, 70% of the previous monthly payment will be applied toward the purchase.

Southwestern Bell Mobile Systems, 17330 Preston Road, Dallas, Texas 75252.

■ **Urix Corp. has introduced an interactive voice response system that will interface with up to 32 incoming telephone lines and allow callers to access selectively more than 65,000 phrases stored in digital form.**

The Urix-100 allows callers to use standard tone-generating telephones to make their selections in response to audio prompting messages. Urix-100 provides up to eight outgoing lines which can be used to transfer incoming calls under program or calling party control, the vendor said.

The system can be programmed to operate as a stand-alone unit or as a voice front-end for a host computer and costs from $15,000 to $50,000.

Urix, 124 Gaither Drive, Mt. Laurel, N.J. 08054.

■ **Adacom Corp. has announced Adalink, a transmission device that provides remote attachment of IBM 3270 Type A coaxial terminals to local or remote controllers over dial-up or leased lines.**

Adalink consists of a CP-100L Controller Adapt-

COMMUNICATIONS

er and the CP-101L Terminal Adapter. Together the devices create the so-called Adalink. When used in a dial telephone environment, terminals with CP-101Ls can share a CP-100L controller port.

Adalink allows the option of synchronous or asynchronous RS-232 communications at data rates of up to 19.2K bit/sec., according to the vendor. It includes built-in data detection and correction capabilities, password security and manual/auto disconnect functions.

The CP-100L and CP-101L cost $890 and $690 individually or $1,500 for the pair.

Adacom, 505 N. Mur-Len Road, Olathe, Kan. 66062.

■ **Digital Speech Systems, Inc. has announced a price reduction on its Telemessenger series of multiline voice storage and forwarding systems for the IBM Personal Computer XT.**

Other features also have been added to the series, including a hard-copy mailbox utilization report, message broadcast and message-wait indicators.

The list price for a two-line system is now $14,500.

Digital Speech Systems, 1732 N. Greenville Ave., Richardson, Texas 75081.

■ **Network Products, Inc. has announced the addition of two line cards designed to increase the networking capabilities of its Virtual Circuit Exchange system, a data switch.**

The V.35 and the V.11 cards can be used with twisted-pair wire, short-haul modems, microwave links, fiber-optic links, T1 subchannels and digital services. They complement the previously available RS-232 interfaces. Each card is said to support two trunks, and one chassis can hold up to 19 line cards.

The V.35 and the V.11 are priced at $2,500 each.

Network Products, 4020 Stirrup Creek Drive, Research Triangle Park, N.C. 27709.

MULTIPLEXERS/ MODEMS

■ **The RF Systems Division of General Instrument Corp. has introduced two modems for its Broadband Local Area Network family of communications products.**

•The M-1700 is a 1.54M bit/sec. T1 modem for trunking applications that is said to incorporate a polling feature that facilitates remote loopback for diagnostic purposes.

The M-1200 is a broadband data modem for 56K and 64K bit/sec. transmission. Units can be ordered for speciality applications. The unit has separate adjustments for transmit and receive frequencies.

The M-1700 costs $2,995, and the M-1200 costs $1,695.

RF Systems Division, Suite 500, General Instrument, 2350 W. River Park Drive, Tucson, Ariz. 85745.

■ **Lightwave Communications, Inc. has announced a fiber-optic multiplexer that supports eight asynchronous RS-232C channels.**

The FO-232/8 MUX multiplexer is said to transmit and receive at rates up to 19.2K bit/sec. The data channels are accessed at the rear of the unit through 25-pin D subminiature connectors. Front-panel indicators allow for diagnostics and error conditions. The optical link is full- or half-duplex and operates at distances up to 2 kilometers over 50 micron fiber-optic cables.

The FO-232/8 MUX costs $995.

Lightwave Communications, 650 Danbury Road, Ridgefield, Conn., 06877.

■ **Gandalf Data, Inc. has announced several new modems, including the 2,400 bit/sec. Access Series 24S, which costs $650 and is compatible with Hayes Microcomputer Products, Inc. modem commands.**

The asynchronous/synchronous modem offers multiple number recall, automatic redialing, alternate number dialing and automatic logon. The Access Series 24S has fallback rates of 300 bit/sec. and 1,200 bit/sec.

The Access Series 212 modem is full duplex, asynchronous or synchronous and equipped with automatic dialing, logon and answering features. It is compatible with AT&T 212A or 103/113 standards. The Access Series 208 is synchronous only, supporting half-duplex traffic over two wires or full-duplex over four wires at speeds up to 4.8K bit/sec.

The Fastrak 96 and 96FP full-duplex, synchronous modems can transmit at rates of 4.8K, 7.2K and 9.6K bit/sec. They are V.29 compatible and designed for point-to-point applications.The Fastrak 14.4 modem is synchronous and operates point-to-point over unconditioned leased lines. The modem works with Trellis coded modulation and is compatible with 9.6 bit/sec. V.29 modems.

The modems range in price from the $545 Access Series 212 to $3,950 for the high-end Fastrak.

Gandalf Data, 1020 S. Noel, Wheeling, Ill. 60090.

NETWORK SERVICES

■ **Wang Information Services Corp., a division of Wang Laboratories, Inc., has announced its Text and Data Messaging service for customers with multiple locations or with employees who travel.**

Text and Data Messaging features WP 600, a portable terminal, a 16-char./sec. printer and Wang Model 7000 modem, a snap-on AT&T Bell Laboratories 103-compatible communications device that plugs into an RJ-11 telephone jack. The product enables users to access host data bases through asynchronous ports.

The battery-powered WP 600 weighs 6¼ lb. In addition to operating as a terminal, the product can function as a typewriter or word processor. Word processing capabilities include automatic centering, under-

Continued on page 72

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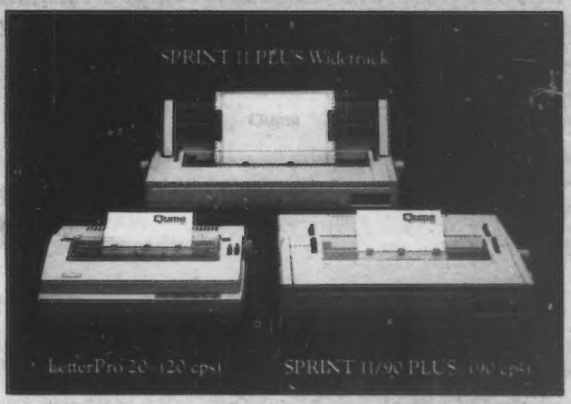

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COMMUNICATIONS

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lining, reformatting and deletion.

The new service is available for $90 a month plus 35 cent/min of measured long-distance communications usage accessed through Wang Information Services Corp.'s toll-free telephone numbers.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

■ **General Electric Information Services Co. (Geisco), has announced Quik-Gram, a paper mail product that allows users of its Quik-Comm electronic mailbox service to communicate with anyone that has a U.S. postal address.**

Quik-Gram messages are transmitted electronically to sites where they are printed on specially designed stationery, folded, inserted into envelopes and prepared for delivery by the U.S. Postal Service.

Options include an address storage function that allows the user to create, store and update a mailing list.

Quik-Gram is priced at $2.25 per message for the first page of up to 40 lines and $1 for each additional page of up to 50 lines.

Geisco, 401 N. Washington St., Rockville, Md. 20850.

■ **Tymnet, Inc., a unit of McDonnell Douglas Network Systems Co., announced recently that it has completed the expansion of its 2,400 bit/sec. asynchronous communications service to 80 U.S. cities.**

The 2,400 bit/sec. service would carry the same hourly rate as its 1,200 bit/sec. service, Tymnet said. The 2,400 bit/sec. service complements its 300 to 1,200 bit/sec. dial-up service, which is accessible with a local phone call in 540 U.S. cities, according to the vendor.

Tymnet, 2710 Orchard Pkwy., San Jose, Calif. 93154.

■ **McDonnell Douglas Applied Communications Systems Co. has announced Ontyme Connection, an electronic messaging system for the IBM Personal Computer, Personal Computer XT and compatible computers. The firm also announced an enhanced version of Tym/Comm, a communications package that lets the Personal Computer function as a terminal-to-host computer.**

Ontyme Connection uses menus and prompts to lead users through the tasks associated with sending and receiving messages. One keystroke connects the micro to the Ontyme messaging net.

Tym/Comm Version 3 is said to offer file transfer capability in IBM environments and full screen terminal emulation. It carries a monthly subscription charge of $200.

Ontyme Connection costs $149.95 in quantities of one to nine; $129.95 in quantities of nine to 99; and $109.95 for quantities of 100 or more. Tym/Comm costs $170.

McDonnell Douglas Applied Communications Systems, 20605 Valley Green Drive, Cupertino, Calif. 95014.

■ **Western Union Co. has reduced daytime rates for its Optimized Wats long-distance telephone service by up to 10%. The rate reduction also extends to Operation Bigpipe, the packaged Optimized Wats service, and to the Software Defined Network Services.**

Daytime, short-haul (less than 600 miles) rates, with charges for less than 60 hours of calling per month were cut by 10%. Long-haul (more than 600 miles) daytime rates at the same hourly usage levels were reduced by 5% for less than 60 hours of calling per month.

Optimized Wats service off-network rates were trimmed by about 10% with the average commercial Western Union customer realizing a 5% reduction. Per-minute rates are 31 cents during the day, 24 cents in the evening and 15 cents at night.

Western Union was able to reduce these rates by raising off-peak hourly rates.

Western Union, One Lake St., Upper Saddle River, N.J. 07458.

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TEST EQUIPMENT

■ **Adtech, Inc. has announced a sim-**

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Link options added to NCR 3690 family

a CCITT V.35 interface, and the remaining interfaces will be available in the third quarter. The purchase price for a fully configured HLC-MIM is roughly $30,000, the company said.

The Comten T2033/2034 High-Speed Multiplexer provides the 3690 Comten processor with a T1 interface, supporting 1.54M bit/sec. or 2.04M bit/sec. digital transmissions.

The multiplexer divides the T1 link into as many as 128 lower speed channels ranging in speed from 50 bit/sec. to 1.54M bit/sec. The unit can be set up as a stand-alone device or integrated into the 3690 processor.

When used with the 3690 console, the multiplexer can provide line management and diagnostic capabilities, including reconfiguration from a local or remote console; display channel, trunk and remote site statistics; and perform diagnostic tests, the company reported.

The unit will be available in the fourth quarter of 1985 on a stand-alone basis with voice capability with the other configurations coming in the first and second quarters of 1986. Depending on configuration, NCR Comten is pricing the multiplexer between $11,000 and $100,000, the vendor said.

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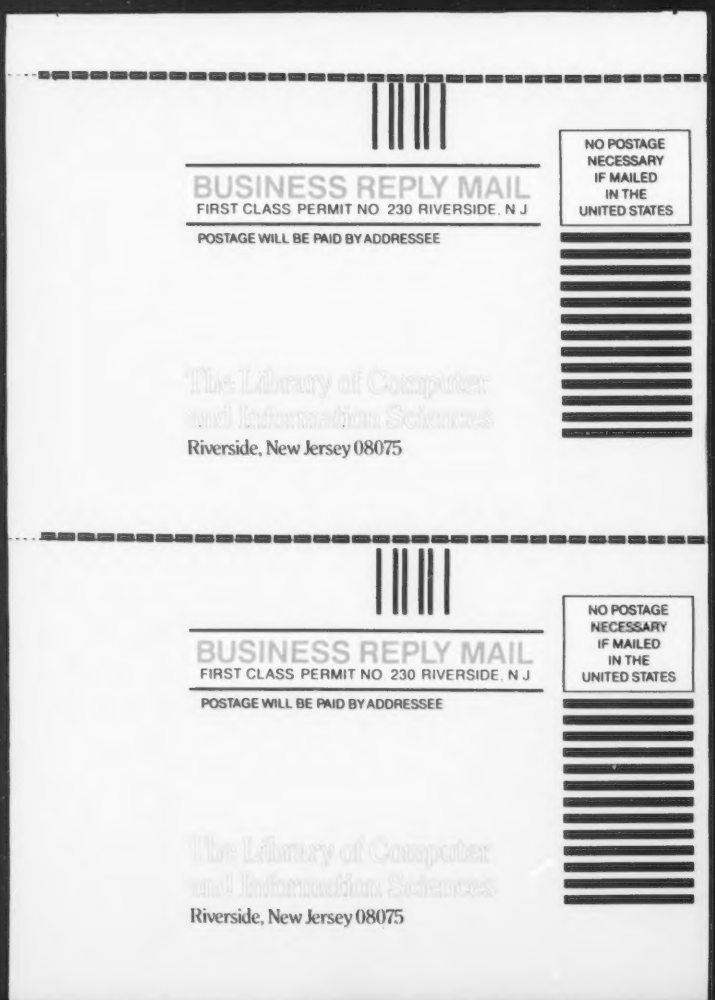
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3 bestselling guides to systems design and systems management in the new era of computer technology.

System Design from Provably Correct Constructs

We are on the verge of a great explosion in software, says Martin. But before we get there, we must have more reliable ways to create systems. In this important guide, Martin examines the techniques and tools that are bringing in the automated development of new systems.

These tools are designed to *automatically generate bug-free programs*... they are leading toward complex specifications and code which can be proven mathematically to be free from errors and inconsistencies.

Martin explores: • higher-order software (HOS) • co-control structures • loops and recursion • data base planning • automated data modelling • data navigation diagrams • HOS software tools • avoiding mismatches between design levels • front-end methodologies • and more.

Diagramming Techniques For Analysts and Programmers

Martin's exploration of effective computer-aided design continues with an evaluation of the diagramming techniques currently used to control the specification and development of large systems.

The goal of this book is to demonstrate ways to integrate existing diagramming tools into a structured design method. It also serves as an excellent tutorial on every technique, including such methods as:

• Decomposition diagrams • dependency diagrams • data flow diagrams • structure charts • HIPO diagrams • Warnier-Orr diagrams • Michael Jackson diagrams • flowcharts • structured English and pseudocode • state transition diagrams • decision trees and decision tables • and more, including a recommended set of diagramming standards to be followed.

Software Maintenance: The Problem and Its Solutions

Martin shows that software maintenance actually claims the largest share of the software dollar. In this important guide, he shows how to design new systems so that they will be easily maintainable... and how to extend those methodologies to the problems of maintaining already existing systems.

The book covers everything from coding techniques to management actions, from system design to strategic planning. In it, Martin covers such major topics as:

• The use of data bases • how to create stable data structures • documentation • fourth generation languages • user-driven computing • prototyping • information engineering • preprogrammed packages • tools for maintenance • debugging techniques for complex systems • maintenance teams • strategic planning and migration.

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James Martin is presently an independent consultant throughout the computer industry. He was with IBM for 19 years—both in the field and in the laboratories—and spent 10 years at the prestigious IBM Systems Research Institute in New York. He is the world's most popular computer writer. Two of these books are co-authored by **Carma McClure, Ph.D.**, an authority on structured techniques for fourth-generation languages.

COMMUNICATIONS

Continued from page 72

ulator to test how delay and random errors associated with satellite data links can affect digital data.

Available in bench- or rack-mounted units, the SX/11 can mimic a full-duplex data link or can be used in testing to add errors or delays to an existing link. The product operates with standard data transmission rates between 2,400 and 64K bit/sec.

The SX/11 injects bit errors generated by a random code sequence into two data streams. Error rates can be zero, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} and 10^{-7}.

It costs from $2,670 to $2,790.

Adtech, 1814 Algaroba St., Honolulu, Hawaii 96826.

■ **Telecommunications Techniques Corp. has released a DS1C/DS2 Data Interface for is Fireberd family of data error analyzers.**

The interface is said to allow Fireberd users to test data communications systems at DS1C/T1C (3.152M bytes) or DS2/T2 (6.312M bytes) rates. The interface tests isolate line troubles for periodic maintenance and evaluate the installation of communications links and equipment operating at T1C and T2 rates.

The DS1C/DS2 Interface costs $995.

Telecommunications Techniques, P. O. Box 6027, 444 N. Frederick Ave., Gaithersburg, Md. 20877.

AUXILIARY EQUIPMENT

■ **Western Telematic, Inc. has introduced a switch that enables up to four users to share an RS-232 port.**

With TAS-41, a user can access the port by entering a Return code from a keyboard. A Ready message indicates a port connection; no response means that the port is in use.

If it is busy, a Port Available message indicates when it has become free.

To disconnect a port connection, a user enters a two- or four-character logoff sequence.

Users can set the device so it will automatically log off someone after a period of inactivity, according to the vendor. A user can select data transmission rates from 300 to 9.6K bit/sec.

TAS-41 costs $395.

Western Telematic, 2435 Anne St., Santa Ana, Calif. 92704.

■ **Signal Processing Systems, Inc. has announced a plug-in board that interfaces Digital Equipment Corp. or DEC-compatible processors with Gould, Inc. computers.**

The HSD/Unibus Adaptor connects the Gould high-speed data I/O processor to DEC's Unibus, enabling any Gould Concert 32 computer to communicate with a DEC computer or compatible, the company claimed. The plug-in board adapter performs in master and slave modes on the Unibus and maps an 18-bit Unibus address to 24-bit Gould addresses.

The HSD/Unibus Adaptor includes a set of control registers set up by the Gould computers to specify the desired function.

The HSD/Unibus Adaptor is priced at $19,500.

Signal Processing Systems, 223 Crescent St., Waltham, Mass. 02154.

■ **Electronic Specialists, Inc. has announced Kleen Line Model PDS-11, a modem protection package that works with standard four-pin, RJ-11 modular phone connectors.**

The product was designed to suppress telephone line spikes caused by lightning or telephone-office switching gear. Kleen Line incorporates a two-stage semiconductor and gas discharge tube suppression technique. An isolated ground is employed to protect equipment from lightning surges.

Model PDS-11 suppresses spikes on the red and green wires within a phone line — pins three and four — and brings yellow and black lines straight through.

Model PDS-11 costs $69.95.

Electronic Specialists, 171 S. Main St., Natick, Mass. 01760.

From page 67

Sequel switch eases extension

nections, the vendor said.

When divided, the halves are identified as local and remote. All port configuration changes are entered with the local portion, which updates the remote accordingly.

Although not currently available, the company is working on a T1 1.54M bit/sec. interface that will enable switch parts to be separated at "virtually any distance," the company reported.

Standard switch features include rate conversion, which enables a computer to communicate at its fastest rate with slower peripheral devices; port contention by name, number or class; a Help menu; the ability to toggle between two ports; priority queuing; automatic speed adoption; and password protection.

An optional feature is security callback. Users accessing the switch through dial-up lines are disconnected after entering a password and then called back at a predetermined number. The $800 option works with Hayes Microcomputer Products, Inc.-compatible modems and supports 36 ports.

The Sequel switch has a two-level configuration capability that enables the switch ports to be configured one way during the day, for example, and then automatically reconfigured at night to meet different needs.

A basic switch unit costs $800, and line cards cost $450 each. A typical 96-port switch would cost $8,000, the company said.

Lotus™ on a VAX™?

dBASE II on a VAX?	SpellStar on a PRO?	WordStar on a PDP-11?
Friday! on a Micro VAX?	MailMerge on a PDP-11?	Spellbinder on an Eclipse?
Condor on a PDP-11?	PMS II on a VAX?	Friday! on a VAX?
PFS:File on a PRO?	dBASE II on a PDP-11?	PerfectWriter on a PRO?
Personal Pearl on a VAX?	Lotus 1-2-3 on a PDP-11?	RM/COBOL on a PDP-11?
QuickCode on a Micro VAX?	Open Access on a PRO?	RTCS/UDI on a VAX?
Spellbinder on a VAX?	MS FORTRAN on a VAX?	Mass-11 on a PDP-11?
WordStar on an MV/10000?	Condor on an MV/10000?	Milestone on an Eclipse?
R:base 4000 on a VAX?	Multiplan on a PDP-11?	Lotus 1-2-3 on a Micro VAX?
Multiplan on a PDP-11?	WordStar on a VAX?	Peachtree on a VAX?
PL/M on a VAX?	SuperCalc 2 on an Eclipse?	SpellStar on a Micro VAX?
SuperCalc 3 on a PRO?	PertMaster on a PRO?	Mass-11 on a PRO?
T/Maker Integrated on a VAX?	Palantir on a VAX?	Datebook II on a VAX?
MS BASIC on a Micro VAX?	QuickCode on a PDP-11?	PMS II on a PDP-11?
Milestone on a PDP-11?	DISC-DBL on a VAX?	Final Word on MV/10000?
Palantir on a PDP-11?	PerfectWriter on a PDP-11?	[illegible] a Micro VAX?

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From page 67

Ad campaigns miss the mark

the most out of my SNA network through Digital Equipment Corp.'s Decnet," a question posed by an ad on the New England Sports Network cable channel.

But does it work with Frigidaire

Truth be told, I'd never thought about it much. Never really networked before, either. As to getting the most out of SNA, I can't say I've tried any of the other methods yet, and I'm not sure if I would try doing it with Decnet. Does it work with Frigidaires? How about my Caloric range? Will Sears, Roebuck & Co. install it if I charge it?

If I do get these services, I suppose I should check to make sure they can be used with AT&T Unix System V. I saw an advertisement in Sports Illustrated for it. There, among stories about baseball and football, nestled ads for this operating system, a developing industry standard.

But what's an operating system? What did the other four systems do? What makes a system operate, and when it is going how can you tell? Can System V help prevent rust on patio furniture? Will it support the gentle cycle on my Hotpoint washer? If I add it to the gas in my Buick will it reduce engine knock?

It's so confusing. It all started when Apple Computer, Inc. heralded 1984 with spooky advertising about how a computer was going to change the world. That year seemed to leak away without any noticeable changes, except one thing: Other befuddling ads began to appear.

In one, elephants parade through the financial district of an unnamed city stressing the benefits of this company's diskettes. Although it is unclear what the ad is for, I imagine it has something to do with the circus.

And, in the middle of a Celtics-Lakers basketball game, my local telephone company came on to inform me that they offer one-stop shopping for Data General Corp., Wang Laboratories, Inc. and other office equipment. I'm not stupid. Data General must hawk data that can be used to serve general business needs, but I'm not sure of Wang's role. Maybe it sells furniture or typewriters.

While I still have to bone up on a few of these things, at least I have a firm understanding of what IBM sells: computers that help manage ducks and hats, right?

From page 67

Box converters are still viable

Box-type converters can be justified for other applications. It would cost much more, for example, to upgrade a computer from IBM's Binary Synchronous Communications protocol to Synchronous Data Link Control (SDLC) than it would to provide SDLC support via a protocol converter.

And it is impractical to throw out an installed base of asynchronous devices to get better data integrity. A protocol converter offers an instant solution — without the problems associated with new systems.

Ideal for temporary problems

Protocol converters are also ideal as a solution to a temporary problem. For example, a user with an eight-year capital equipment write-off period may have a hard time replacing computer equipment in mid-cycle. A protocol converter can bring the system into the required operation mode, such as enabling a DEC VAX-11/780 to communicate with an IBM 3270 cluster controller.

The converter may be justified on four years of service, after which it may be viewed as a throw-away item.

Cost, in fact, no longer is the primary selling point for protocol converters. The one feature that makes these devices viable today is connectivity. People are buying protocol converters to overcome compatibility problems and complete a system.

Protocol converters are adaptable devices that can open a broad range of interface capabilities and will continue to do so for many users for some time to come. Most protocol converters are easy to install and maintain. But there is no question that discrete stand-alone protocol converters will start to diminish as newer computers equipped with emulation capabilities displace those now in operation.

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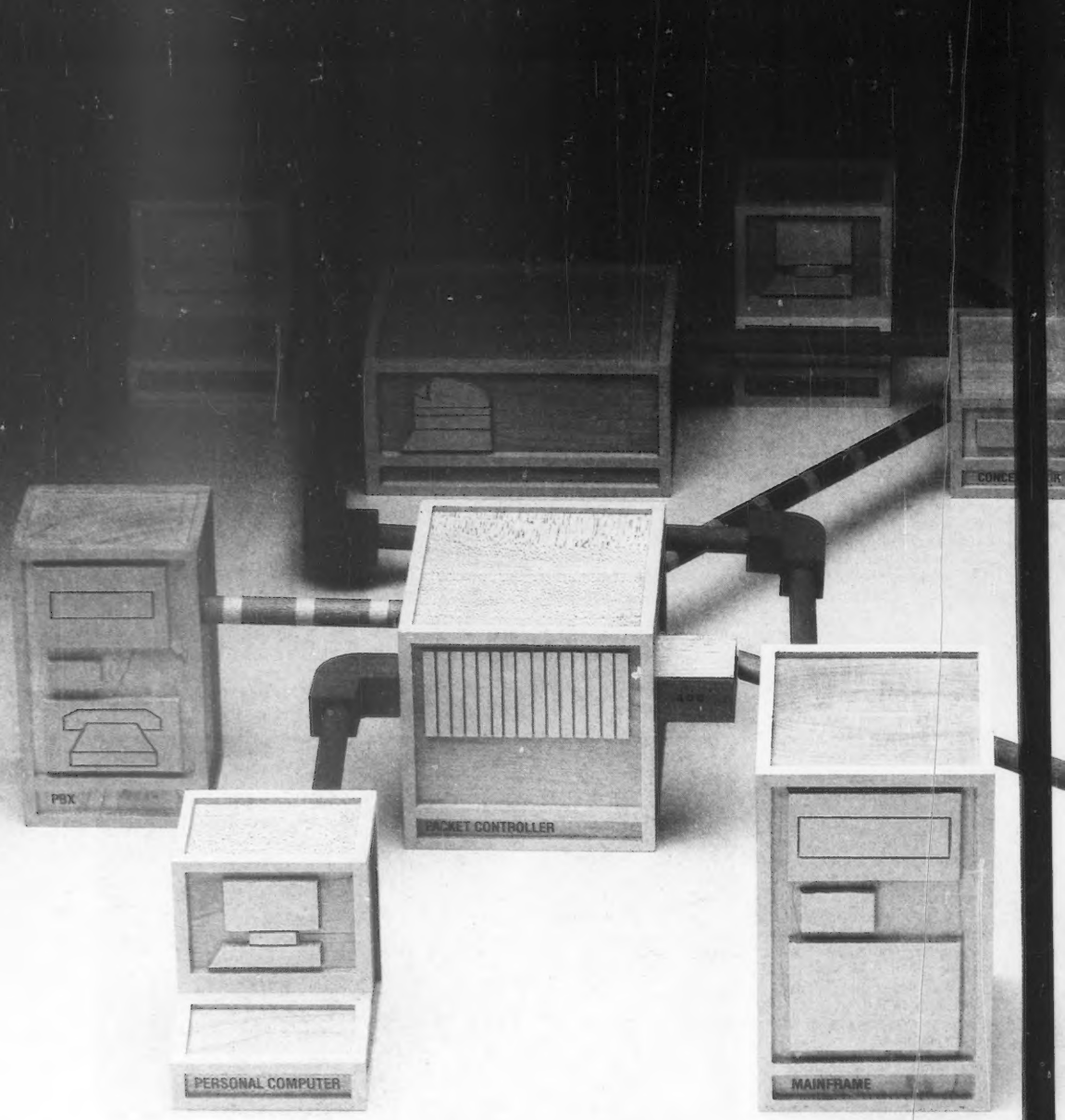

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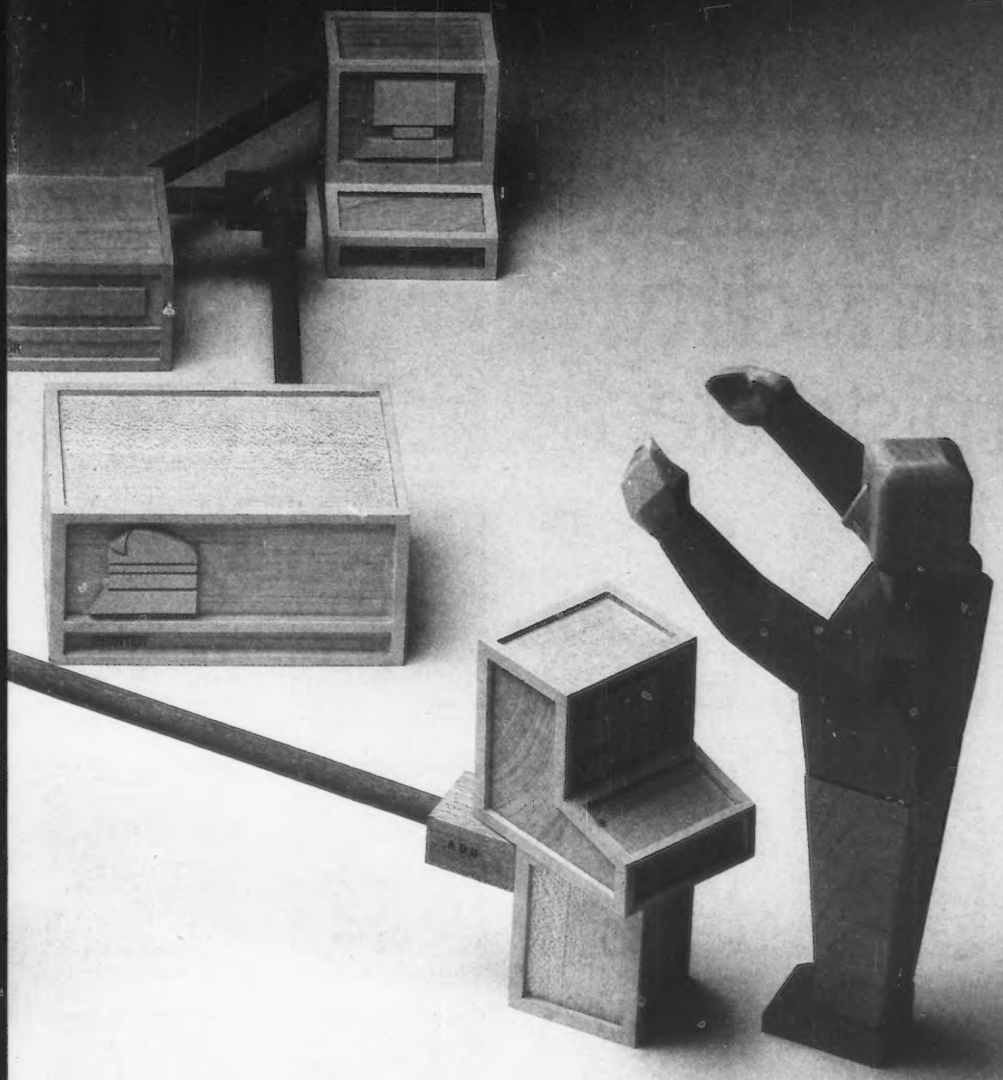

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Dog-eared jacket

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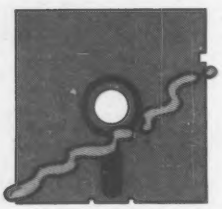
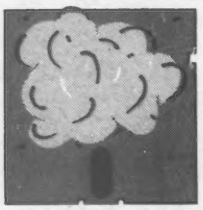
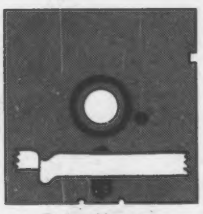
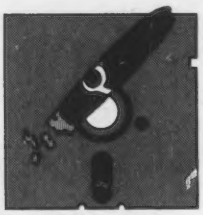
Maria's liquid cover

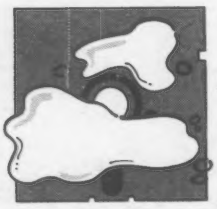

Hot dog mustard


Dust (cough-cough)

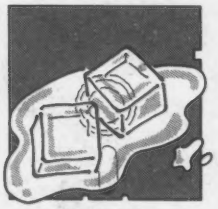

Tacky white tape

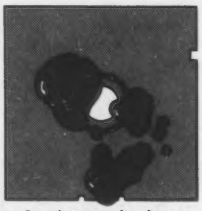

Boss's cigar ashes

Dry martini, one olive


Spilled milk

Potted plant–no pot


The big chill


Lunchcounter ketchup

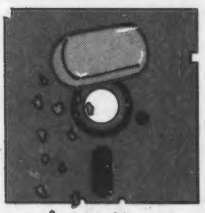
Clouds of smoke

Fizzy orange soda

Waterbased ink spots

Sunny side up

English breakfast tea


Eraser bits

Chocolate fingerprints

Sudsy soap bubbles

One scoop of ice cream

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

Users await HP Spectrum

Now it's waiting time for Hewlett-Packard Co., time to wait for users to decide if they like what they hear or dislike what they don't see.

Executives at the Palo Alto, Calif.-based company have promised a smooth migration path from HP's existing minicomputer lines — the HP 3000 general-purpose computer, the HP 1000 real-time system and the HP 9000 design system — to the next generation of HP machines, the Spectrum. That promise from HP President John A. Young is the company's guarantee that software running on current lines will be transferable to the reduced-instruction-set-based Spectrum with no loss of performance and no recompiling when Spectrum is introduced in early 1986.

Running an HP 3000 program through a 5-minute compiling process reportedly will provide improved performance, although it might not match the 10 million instructions per second performance of a program written for Spectrum.

Reaction to Young's promise and first public prediction of a Spectrum introduction time frame has begun to drift in.

From an HP users conference came bitter comments about Spectrum being too little, too late and threats of users jumping ship from HP 3000 Series 68s to the IBM 4300.

From that same conference came reports that HP was backing off from its migration promise for some HP 1000 applications.

In the Midwest, a manufacturer said it doesn't matter what Spectrum looks

Continued on page 86

DEC's VT100 terminal faces certain retirement

By Donna Raimondi

MAYNARD, Mass. — The ubiquitous Digital Equipment Corp. VT100 terminal is about to retire.

The line of asynchronous terminals became a standard second in popularity only to IBM's 3270 series terminals in the six years of its existence, with approximately 800,000 installed in the U.S. alone. Although official notice has not come from DEC, a spokesman verified that production of the line has stopped, and the company will soon announce price slashes designed to clear out the inventory.

Out to pasture: the VT100

The VT100's demise comes as no surprise in the industry. When the VT220 line was introduced in November 1983, DEC promised to support the older line for two more years, according to Tom Madden, product manager for terminals. "It is a normal end-of-life situation," Madden said. Maintenance will continue as usual.

The VT100's detachable keyboard and support of the X3.64 protocol version of Ascii prompted dozens of companies to emulate the product since its 1979 debut. Because the terminal was DEC's choice of display for its popular VAX series machines, demand for the unit was higher than the company anticipated, said Ilene Goldman, research analyst for the workstation market program at International Data Corp., located in Framingham, Mass.

Historically, DEC did not take advantage of the market position that it created with the VT100, Goldman said. It often took three to five months to buy the terminals from DEC, a factor that strengthened the opportunity for the independent makers. DEC's pricing for the VT100 did not match what the rest of the industry was selling the emulators for, which gave the clones a chance to make inroads into the VT100 market.

DEC's strategy for the successor VT200 line of terminals is entirely different, Goldman said. The VT200 line is kept competitively priced, produced so that orders can be quickly filled and marketed not

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■ The University of Illinois is near completion of a parallel processing supercomputer/**82**

■ Applied Digital Data Systems has announced two multiuser systems, the Adds 1720 and the Adds 1740/**82**

■ A reconfigured disk system is being offered by Data General for its MV/10000 systems/**86**

Zero One processor debuts

Zero One Systems, Inc. of Santa Clara, Calif., a systems integrator, has introduced a front-end processor featuring high-speed communications and designed to be compatible with Cray Research, Inc. supercomputers.

The product is Zero One's enhanced version of the Convex Computer Corp. C-1 and is offered by Zero One under an agreement with Convex.

A Zero One spokesman said that the enhancements include a Fortran preprocessor and Network Systems Corp.'s Hyperchannel 6M byte/sec. local-area network equipment.

The system was designed as a Cray-compatible front-end machine or a Cray-compatible entry-level system. It features Cray disk and file system compatibility and the AT&T Unix 4.2 BSD version of the AT&T Cray Station Server, according to the spokesman.

Zero One also adds from one to six Ibis Systems, Inc. 1.4G-byte disk drives depending on customer needs.

The systems cost $1 million to $1.5 million, depending on the number of disk drives purchased. Delivery is scheduled for the fourth quarter of this year, the vendor said.

Lynk's first line targets IBM systems

Lynk Corp. of King of Prussia, Pa., is set to announce its first products this week, a family of workstations and printers designed for use with IBM's System/34, 36 and 38 minicomputers and mainframes.

The product line is said to include workstations designed to be field upgradable to an IBM-compatible desktop computer and a multimode printer that emulates three IBM printers through software overlays.

The Lynkstation/912 is an entry-level workstation said to be compatible with the IBM 5291 Model 2 display station and upgradable to the level of an IBM 3180 terminal. The Lynkstation/912, with a 15-in. screen, reportedly features 50% more viewing area than the 5291.

It costs $1,525.

The Lynkstation/802 is said to be an advanced capabilities workstation compatible with the 3180 Model 2 but with the added benefit of a dual addressing capability that allows attachment of a multimode printer.

The Lynkstation/802 costs $1,875.

According to the vendor, the Lynkstation/PC offers emulation of the IBM Personal Computer when used in conjunction with the disk storage of the host computer, providing the freestanding computation capability of the IBM Personal Computer and the workstation capabilities of the Lynkstation/802.

The basic Lynkstation/PC with 256K bytes of memory costs $2,175. Additional main memory and a dedicated dual 360K-byte disk drive also are available.

The company also announced Lynkwriter/214, a printer designed to provide draft-quality, near-letter-quality, letter-quality and color graphics printing capabilities at speeds up to 250 char./sec. It emulates the IBM 4214 printer. Working in combination with cartridge-resident Lynkstation software, the Lynkwriter/214 can be configured to emulate IBM 5256 and 5219 printers.

It costs $2,795, plus $230 for each Lynkstation emulation cartridge.

All of the products are scheduled to be available 60 days after receipt of order.

Memorex unveils storage subsystem

Memorex Corp. in Santa Clara, Calif., has announced a solid-state storage subsystem with an automatic data backup and recovery system.

The Memorex 6880 can emulate the IBM 3380, 3350 or 2305 Model 2 disk subsystem. Its dual-port device has 32M bytes of storage, which can be expanded to 128M bytes. Up to four 6880 storage units can be attached to a subsystem, permitting a maximum storage capacity of 512M bytes.

The product includes a built-in Winchester disk drive and uses an uninterruptible power supply or optional Memorex 6889 backup power unit for data backup in case of power loss or fluctuations.

Dual ports are said to increase performance by 15% to 20% over single ports by allowing two concurrent data transfers.

Purchase price of the 6880 subsystem, including a two-director 6888 control unit and one 128M-byte 6880 storage unit, is $431,250. An optional 6889 backup power unit costs $20,000.

Adds multiuser units debut

Applied Digital Data Systems, Inc. (Adds), based in Hauppauge, N.Y., has unwrapped two multiuser systems that support the Adds data base operating system — an enhanced version of Pick Systems' Pick operating system.

The company, a wholly owned subsidiary of NCR Corp., said the Adds Mentor 1720 and 1740 models in the 1700 system process applications exactly as they run on larger Mentor systems. The 1720 and 1740 models support up to three and eight users, respectively.

The 1700 system machines are said to be able to use up to 10 ports for connecting terminals, printers or communications lines.

Both computers have 16-bit Intel Corp. 80286 processors, 512K bytes of random-access memory, a keyboard, a terminal, a Centronics Data Computer Corp. parallel interface and a 1.2M-byte flexible disk, according to the vendor.

The 1720 has a 20M-byte hard disk and three RS-232C serial interface ports; the 1740 has a 40M-byte disk, eight RS-232C ports and a ¼-in. tape drive that takes either 45M- or 60M-byte tapes.

The 1720 costs $7,500, and the 1740 costs $12,750 without the operating system. The operating system adds $1,000 to the cost of the 1720 and $1,500 to the 1740 eight-user version.

University crossbar scheme connects processor clusters

By Donna Raimondi

CHAMPAIGN, Ill. — Clusters of processors interconnected by a type of crossbar switch system form the basis for the University of Illinois' entry into the multiple processor supercomputer arena.

"We're using floating-point processors that do 64-bit floating-point arithmetic, and we're using a very rich interconnection scheme," said David J. Kuck, director of the university's Center for Supercomputing Research and Development (CSRD). The CSRD's plan for a crossbar switch system is similar to those that a telephone company uses to allow any phone to "talk" to any other phone.

The crossbar switch system — impractical when more than a few tens of processors are clustered together — has been modified since the 1970s by Kuck and his associates, he said. The resultant network, dubbed the Omega, is being considered for IBM's Yorktown Heights, N.Y., RP III parallel processor project and for several universities' parallel processing schemes, he said.

Each processor of the type that the CSRD uses in its Cedar parallel processor project generates about 10M floating-point operations per second. The FX/8 processors were built by Alliant Computer Systems Corp. based in Acton, Mass., using Weitek Corp. 64-bit floating-point chip sets, and Motorola, Inc. 68020 instruction sets. Cedar processors also include the synchronization and interconnection hardware and software needed to execute CSRD's "do-loops" procedures across multiple processors.

There are differences between the Cedar and Alliant's FX/8 systems. "You can't, for example, solve the cache coherency problem in hardware when you get up to large numbers of processors. Alliant has a coherent cache-based cluster, but you can't use that same method with large numbers of processors. So there we are bringing in some software, and integrating it with the hardware at a higher level," Kuck said.

As with other parallel processing schemes, software that enables applications to take advantage of the architecture does not really exist, according to Kuck. The CSRD has been working on a software system called Parafrase for about 15 years, independently of the Cedar project. Parafrase was developed to analyze Fortran programs and to try to determine what constitutes a good computer architecture, Kuck said. Along the way, compiler algorithms for particular architectures evolved.

The Parafrase effort continues to produce research on new compilation techniques, but it also has been used for about five years to drive simulators of new multiprocessors.

A section of the supercomputer research is devoted to applications development. "We are using Parafrase to get applications in a parallel form as much as possible automatically,

Continued on page 86

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From page 81

DEC's VT100 terminal faces certain retirement

only within DEC's usual distribution channels but also in other areas.

Analysts expect DEC to announce a VT230 model before the end of 1985, Goldman said, although DEC denies that the announcement will occur. The current models in the VT200 family offer VT100 emulation, but users complain that some VT100 features are missing.

The VT200 keyboard is not as popular as that of the VT100 either, Goldman said, noting that those two problems will probably be addressed in the expected VT230 release.

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From page 82

Crossbar scheme connects processors

and then [Ahmed Sameh, applications director] is attacking them with new algorithms," Kuck said. Applications are being developed jointly with departments in the university and with outside companies. Applications include problems in meteorology, astronomy, physics, quantum chemistry, circuit simulation and geodetic network relaxation.

The university's project is funded by the National Science Foundation, the U.S. Department of Energy, the State of Illinois, IBM and other commercial backers.

Some of the products resulting from the university's research will be available in the public domain; others will be marketed by various members of the research team, said Edward Davidson, associate director of the project.

"We hope to capitalize in a variety of ways," Davidson said. Some of the people involved in the research hope to form a company to market software and hardware designs to industry, he said. At this stage, that company is a "gleam in the eye" of the designers, he added.

At present, there are two clusters of eight processors each. By the second quarter of 1986, Kuck hopes to have the two clusters hooked together, tested and working, he said. Then the software and applications will be added so that by the end of 1986 the project can show some performance results.

The project's funding allows for doubling the number of processors each year until a 128-processor machine is produced. However, Kuck believes that once the switch is in place, and if additional funding is available, he can double the machine's power at a still faster rate. Under those circumstances the team could have 512 processors by early 1987.

There are no plans to make copies of the machine within the university, Davidson said. "We will continue to build new architectures, and to improve, change and expand the Cedar system over a long period of time," he said.

■

Omega modifies crossbar switching

The crossbar switching scheme used on the University of Illinois' experimental Cedar parallel supercomputer is called an Omega network.

The Omega — under development at Illinois since the 1970s — differs from a true crossbar in that, instead of each processor being able to access any memory — for example, 64 simultaneous requests from 64 processors going out to 64 memories and all requests being honored at once — the process is broken down into stages.

The Cedar's 8-by-8 crossbar means that, of a hypothetical 64 processors (the computer now has 16), each group of eight processors is connected to one box with eight I/O channels. That box is then hard wired to each of eight boxes in stage two.

Each stage two box is connected to eight memories. Cedar's two unidirectional Omega networks enable data to flow from processor to memory or from memory to processor. In a bidirectional network, all processors and memories can carry information in any direction.

Factors that affect the quality and speed of crossbar techniques include the total size of the switch. A 64-by-64 true crossbar may be the fastest solution but also would be the most expensive. In an 8-by-8 Omega switch, each output is driven by a multiplexer, eight wide, to connect to all outputs. In a 64-by-64 scheme, each output would also be driven by a multiplexer, so the cost is directly proportional to the number of elements in the crossbar.

The data path width is another factor that governs performance. In the Cedar, 76 wires run between each processor and the crossbar switch because 64-bit data words plus extra checking bits are sent as a group. In contrast, a telephone crossbar switch can send data along one wire.

Extra buffering space in each of the boxes in the crossbar scheme enables users of the Cedar to wait in the buffer for available resources if the desired memory is busy. That small amount of first-in first-out buffering can increase the performance of the 8-by-8 crossbar switch scheme to that of a 64-by-64 scheme.

— Donna Raimondi

DG enhances disk system, reduces price

Data General Corp.'s Information Systems Division in Westboro, Mass., has announced a 5.3G-byte disk configuration designed to provide a $40,000 savings over the cost of previous configurations.

The Model 6350 disk subsystem features three intelligent disk controllers and nine 592M-byte Winchester disks. The subsystem costs $245,000. Previously, the 592M-byte disk drives were available only in groups of three, with a nine-drive system costing $288,000, according to DG.

The package, also available with DG's Eclipse MV/10000, is said to feature bad-block remapping, optimized and overlapping seeks, dual porting, logical-to-physical addressing and incremental backup.

A DG spokesman said the package is suited for customers who require large amounts of on-line storage. The disks and controllers are mounted in three, meter-high cabinets.

A package including the MV/10000, the 6350 disk system, 16M bytes of memory, a magnetic tape subsystem, system console and Data General's AOS/VS operating system costs $470,094.

From page 81

HP users await migration to next-generation Spectrum

like. They aren't even near capacity on their Series 68.

Further west, a data processing executive in a Colorado company using IBM mainframes and HP 3000s said his firm hasn't even looked at migration because it isn't concerned about more major and more pressing issues than those surrounding a minicomputer.

But back in the Midwest, a systems manager was upset that HP wouldn't let his company benchmark the test Spectrum models using their current applications. "Everybody would like to see Spectrum tomorrow, but I'm old-fashioned; I'd like to see it run," he noted.

And a Chicago DP executive reported that he was concerned about the migration issue until he sat down with HP officials and examined Spectrum. "We're much more comfortable than we were six months ago," he observed.

Clearly, DP shops that have outgrown their HP 3000s are concerned about where they can go. Many apparently had expected the Spectrum series, which will start at the high end with a system offering more than five times the performance of the Series 68, to be announced in the fall of 1985 for delivery in early 1986.

They may have based that expectation on HP's installation of more than 100 Spectrum machines in its own facilities. HP reportedly is allowing third-party software developers and software developers from some customer sites to work with those machines for which the hardware portion is said to be complete. Any delays are reported to be the fault of software problems.

But while some users' impatience is understandable, HP's goal is commendable. Minicomputer industry analysts have lauded HP for taking care of its installed base, because even if the new product is late, it doesn't mean a wholesale scrapping of existing programs and hardware.

HP is gambling on a new architecture, a reduced instruction set computer (Risc)-based architecture that also was designed to serve three diverse markets with three different systems. Moving to a Risc machine is a gamble in itself. But HP is complicating that move with a strategy that analysts say will mean sacrificing some processing power for the sake of a smooth, three-pronged migration.

The questions to be answered next year include, How much power will remain? How smooth can that migration be? And when can users get their hands on production models to answer the first two questions for themselves?

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Jeffry Beeler
CW West Coast Bureau

Apple divorce a trade reality

Apple Computer, Inc.'s current dispute with its recently resigned cofounder and chairman, Steve Jobs, is merely the latest in a long string of bitter corporate divorces that have periodically jolted the high-tech industry.

Nearly all the feuds have followed more or less the same familiar pattern: One or more prominent members of a successful, fast-growing vendor grows dissatisfied with his current station and quits to create a new business that competes head to head with his former employer. The defection stuns the established company and produces lingering hard feelings on both sides. In some cases, the grudges even escalate into lawsuits.

Illustrations of such stormy partings of the way abound. One of the most celebrated examples involved Edson De Castro, who left Digital Equipment Corp. during the 1960s to form a rival vendor, Data General Corp., after DEC rejected one of his designs for a proposed minicomputer.

A few years later, a somewhat analogous revolt rocked IBM when Gene Amdahl, who spearheaded development of the landmark 360 architecture, stunned his corporate alma mater by founding the first supplier of 370-compatible mainframes.

Now, the same kind of traumatic separation has overtaken yet another

Continued on page 95

Chip firms urge tariffs

Japanese vendors charged in antidumping petition

By Clinton Wilder

SAN JOSE, Calif. — In the most aggressive protectionist move to date in the U.S. semiconductor industry, three leading Silicon Valley chip vendors last week called for import duties on Japanese semiconductors that they allege are being sold below cost in the U.S.

Intel Corp., National Semiconductor Corp. and Advanced Micro Devices, Inc. announced the joint filing of an antidumping petition with the U.S. International Trade Commission and Department of Commerce against the Japanese imports. The three firms charged eight offshore vendors with selling erasable programmable read-only memory (Eprom) chips below their manufacturing cost in technical violation of U.S. trade agreements.

In calling for duties that would raise the market price of the Japanese chips, the three companies took a large step beyond the pending Semiconductor Industry Association petition seeking greater U.S. access to Japanese markets. With the exception of the smaller Boise, Idaho-based Micron Technology, Inc., U.S. chip makers had previously resisted calling for outright trade barriers.

But the economic pressures of the worst semiconductor slump in history apparently pushed the U.S. market leaders to the limit. "It is evident that Japanese manufacturers have targeted Eprom [chips] just as they did [dynamic random-access memory chips]," Intel General Counsel Tom

Continued on page 95

SIA predicts 18% to 28% surge in 1986 semiconductor sales

By Maura McEnaney

SANTA CLARA, Calif. — The Semiconductor Industry Association (SIA) brought some welcome news to its members recently, predicting a "dramatic turnaround" in chip sales next year.

At the SIA's Annual Forecast dinner, the trade association said it anticipated an 18% to 28% growth rate in sales next year from the depressed levels of this year, which would bring worldwide semiconductor sales to $38 billion by 1988. The forecast was prepared for the SIA by the World Semiconductor Trade Statistics Committee and represents forecasts by 30 U.S., European and Japanese semiconductor manufacturers.

Worldwide sales this year are expected to total $21.6 billion, down 16.8% from the industry high of $26 billion in 1984. Next year, sales will increase to $25.5 billion, the forecast noted.

According to the SIA, the U.S. market will begin to recover in the fourth quarter this year, with sales inching 3.1% above third-quarter results. However, U.S. year-end sales remain grim at 33% below year-ago totals, the SIA noted.

Should the SIA forecast prove correct, the semiconductor industry still faces a long road to recovery. If U.S. sales increase 25% next year to the $10.3 billion predicted, the industry will still be left 11% behind record totals of $11.5 billion in 1984.

At a press conference preceding the SIA

Continued on page 94

■ IBM Japan's agreement to work with Nippon on a value-added network met intense opposition from Nippon's competitors in Japan/**94**

CDC's financial situation still considered gloomy

By Clinton Wilder

MINNEAPOLIS — The financial situation at Control Data Corp. continued to look dismal last week with the expiration of some of its bank loan credit requirement waivers at the end of September.

CDC executives are attempting to renegotiate credit terms with the company's largest lenders, which include Chase Manhattan Bank Corp. and Citicorp of New York and Norwest Bank NA in Minneapolis. With CDC expected to report a substantial loss for the year, some financial analysts said they believe the mainframe vendor's future status hinges on the current negotiations.

"Because some loan covenants have been violated, it cannot be ruled out that one or more of Control Data's banks will demand immediate payment of the loan, forcing the company to test its solvency," Paine Webber, Inc. analyst Jonathan Fram said in a recent investment report on the company. "The company has used about $225 million out of its current $325 million bank line, which should hold the company through the end of this year but makes no provision for future needs."

CDC's financial situation was exacerbated by the recent last-minute cancellation of a $300 million sale of bonds and preferred stock that was intended to secure its current lines of bank credit [CW, Sept. 23]. Wall Street sources said they believe CDC must sell some of its profitable diversified businesses in order to raise needed cash.

CDC announced it is attempting to sell Ticketron, its computerized nationwide ticketing service. Ticketron and the media rating service Arbitron are expected to earn $18 million this year on $225 million in revenue, according to Fram. CDC had not found a buyer for Ticketron in previous sale efforts.

Continued on page 91

Cbema may not support current tax reform plan

By Mitch Betts

WASHINGTON, D.C. — The Computer and Business Equipment Manufacturers Association (Cbema) does not like the way tax reform legislation is moving through the U.S. Congress and has threatened to withdraw its support unless changes are made.

The staff of Congress' Joint Committee on Taxation recently drafted a tax reform plan for use by the U.S. House of Representatives Ways and Means Committee. But Ted A. Heydinger, a Cbema vice-president, said the proposal is a disaster for high-technology industries because it sharply reduces the value of the tax credit for research and development expenses.

This posture is a turnabout from Cbema's generally favorable comments about the Reagan administration's tax reform proposal, which provided high-tech industries with an extended 25% R&D tax credit and a cut in the capital gains tax rate.

As soon as the House Ways and Means Committee released its bill draft — an alternative to the Reagan plan — Cbema issued a statement last month attacking it. "While we're waiting for a final analysis from our tax experts, our understanding thus far forces us to seriously reexamine our support for this tax reform bill," Heydinger said. "We'll be working hard to change it."

Heydinger charged that the committee's draft proposal effectively reduces the R&D tax credit by at least 75%. The plan cuts the R&D credit from 25% to 20% and requires companies to subtract the credit from any R&D expense deductions, he said.

Furthermore, the proposal also requires firms to include R&D expenses when they calculate the proposed minimum corporate tax, which Heydinger said is tantamount to levying

Continued on page 91

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Remedies available to recover copyright damages

SIXTH IN A SERIES

By Jerome J. Roberts and Michael P. Brownell
Special to CW‡

The last article examined many of the fundamental aspects of the proprietary protection provided to semiconductor mask work owners under the Semiconductor Chip Protection Act of 1984. This article summarizes the remedies available to a mask work owner to prevent or recover damages from an infringement of its rights under the act. It also discusses severe limitations of the act's protection.

REMEDIES

Subject to the exceptions listed below, any person who exercises a mask work owner's exclusive rights to reproduce, distribute or sell a chip without authorization from the mask work owner will be liable for infringement. The owner, or exclusive licensee, of all rights to a mask work may institute a civil action for infringement of the mask work provided the infringement occurs after the act's protection has commenced as explained in the previous article and the owner or exclusive licensee has obtained a certificate of registration for the mask work prior to filing the civil action.

The mask work owner or exclusive licensee is entitled to the normal equitable remedies to prevent or restrain infringement, including temporary restraining orders and preliminary and permanent injunctions. Upon finding infringement liability, the court may award to the plaintiff its actual damages and the infringer's profits to the extent they are not computed in the actual damage award.

Alternatively, at any time prior to final judgment, the mask work owner may elect to receive, in lieu of actual damages or the infringer's profits, statutory damages in an amount determined by the court but not more than $250,000.

While a civil action is pending, the court may impound all infringing products and related mask works. In a final judgment, the court may further order the destruction or disposition of such articles.

In addition to the foregoing civil remedies, any chip-based article imported in violation of the mask work owner's exclusive rights is subject to seizure and forfeiture in the same manner as property imported in violation of the customs laws. Under the act, the secretary of the treasury and the U.S. Postal Service are to issue separately or jointly regulations for the enforcement of a mask owner's exclusive rights with respect to importation.

LIMITATIONS

A mask work owner's exclusive rights are subject to several important limitations. First, it is not an infringement for a person to reproduce a mask work solely for teaching, analyzing, or

Roberts and Brownell are attorneys with the law firm of Bermand, Roberts and Kelly in Chicago. The firm's practice deals with legal issues related to procurement, distribution, management and protection of computer resources.

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a second new ASCII display station with even higher function—the IBM 3163.

Outwardly, these two new displays look alike. But the 3163, in addition to its built-in emulation of the IBM 3101 Model 881, also offers the ability to emulate the DEC VT 52 and VT 100* by means of a unique plug-in cartridge.

And while you'll like the power and flexibility of the 3161, for your high-function applications the 3163 goes even further. For example, a 7,680-character buffer and up to three windows enable you to view and modify portions of different host data bases. The 3163 lets you redefine and even recap the keys.

On both displays the setup is menu-guided and written in plain English, so it can be done easily and quickly. The point is, both are designed to improve your user productivity.

Very Attractive Prices

The price per terminal is $695 for the 3161 and $1,095 for the 3163. Quantity discounts are available. What's more, IBM maintenance offerings start as low as $35 per year per terminal for customer carry-in repair.

Now there's a new family of ASCII displays with the quality, service and support IBM is famous for. Both displays are available through IBM Authorized Distributors and IBM marketing representatives.

FEATURES	3161	3163
Lines x Characters	25 x 80	25 x 80
Double-sized chars	No	Yes
Line drawing chars	24	24
Vertical scroll	Jump	Jump/ Smooth
Definable function keys	24	24
Windowing	No	Yes
Partitioning	Horiz	Vert/Horiz

Call 1 800 IBM-2468, Ext. LE/90 for the name of an Authorized Distributor near you.

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evaluating the concepts or techniques embodied in the mask work or for a person who performs the analysis to incorporate the results of such analysis in an original mask work that is made to be distributed.

Second, the owner of a particular chip, including a product containing a chip, made by or with the permission of the mask work owner may import, distribute, dispose of or use the chip without the authority of the mask work owner.

Third, a mask work owner may be unable to assert its remedies against an "innocent purchaser" who purchases a chip made, imported or distributed in violation of a mask work owner's exclusive rights.

An innocent purchaser is one who buys a semiconductor chip product in good faith and without having notice of protection with respect to the semiconductor chip product.

Boeing restructures operations

BELLEVUE, Wash. — Boeing Computer Services Co. last week announced a major restructuring that consolidates its operations into government and commercial sales, with the latter aimed specifically at the energy and manufacturing markets.

The move combines sales, marketing and systems development activities under the newly created Government Information Services and Commercial Information Systems divisions.

In addition, Boeing will consolidate its sales organization into offices in 10 major U.S. cities.

The reorganization will be effective Jan. 1, 1986.

Company officials said the targeting of energy and manufacturing applications is a move intended to play up the company's strengths.

"We are focusing only on those products and services that best meet our customers' needs," according to Vice-President Paul M. Sibalik.

different ASCII displays in one.

The IBM 3161 ASCII Display Station

From page 87

Cbema dislikes tax reform plan

a 20% excise tax on a company's R&D budget.

Inclusion of R&D expenses in the minimum tax would also hurt high-tech firms experiencing economic problems, he said.

"A high-tech company facing tough times still has to spend enormous amounts of money on R&D to remain competitive and get back on its feet," Heydinger said. "But under this proposal, it couldn't deduct those expenses when it calculates the minimum tax," he said.

The proposal raises the effective capital gains tax rate from the current 20% to 21%, rather than President Reagan's planned 17.5%, and cuts the top corporate income tax rate from the current 46% to 35%, rather than 33% as in Reagan's plan.

From page 87

CDC's financial situation gloomy

The company also pledged the stock of Commercial Credit Co., its financial lending service, to satisfy its lead creditors.

Approximately one-third of the assets of Commercial Credit are for sale, and it remains the company's most profitable business with estimated earnings of almost $100 million this year.

CDC has reached an agreement in principle to sell its remaining stake in Nimcos, a unit selling a computer system to monitor noninstitutional prison sentences, to joint owner BI, Inc. of Boulder, Colo.

Last month, BI purchased an additional 16% of the business to bring its share to 77%.

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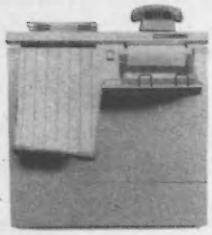

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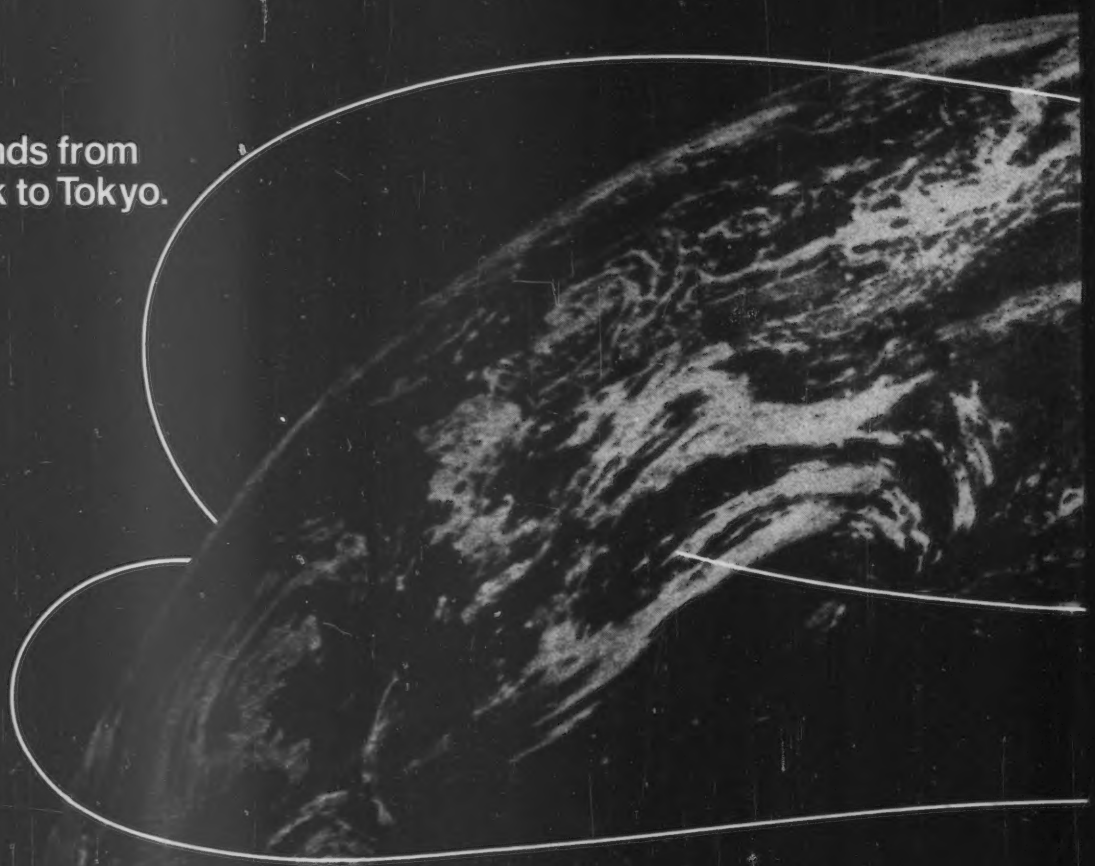

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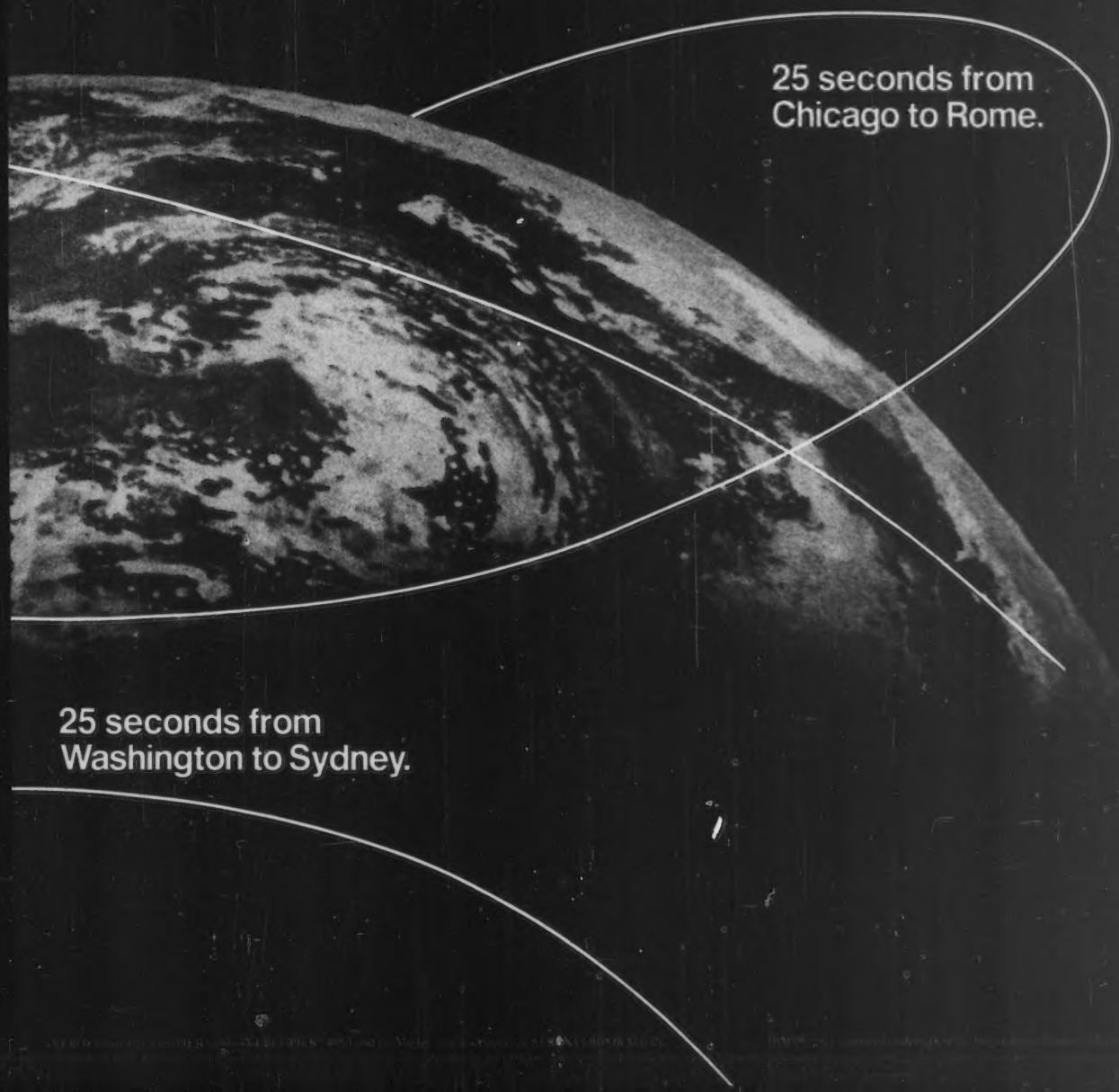

Nippon-IBM Japan venture draws fire

By Takehisa Kondoh
Special to CW

TOKYO (CWN) — Leaders of the Japanese communications and electronics industries expressed fierce opposition to the agreement between Nippon Telegraph and Telephone Corp. and IBM Japan Ltd. to set up a joint firm for networked data communications [CW, Sept. 30].

The Communications Industries Association decided Sept. 27 to appeal to Megumu Sato, Minister of Posts and Telecommunications, expressing its opposition to the Nippon-IBM agreement. The association said the agreement would block the ongoing liberalization of the telecommunications market in Japan.

The association includes representatives of 209 major Japanese electronics and communications manufacturers. Its chairman is Takuma Yamamoto, president of Fujitsu Ltd. The group postponed the details of any counteraction until a steering committee meeting, to be held on a still-unspecified date.

Formation of joint concern

Nippon said that it and IBM's wholly owned Japanese subsidiary would establish an equally held joint concern later this year. The new firm, according to Nippon, will provide enhanced telecommunications services, including value-added networks, by connecting both firms' protocol architectures.

Some Japanese computer vendors that hold large shares of the country's communications market oppose the joint business agreement, terming it a gross violation of Japan's anti-monopoly law and saying it clears the path for IBM to take up the lion's share in the nation's data communications market.

They are expected to ask the Japanese government to oppose the joint company and cite as precedent the British government's decision last year to abort a similar plan between IBM and British Telecom International.

Kondoh is international editor/Asia for the CW Network.

Computerland execs resign

OAKLAND, Calif. — Computerland Corp. Chairman and founder William H. Millard announced last week that company officer Edward Faber had assumed operational control from Millard, who was chief executive officer, and from Millard's daughter, Barbara, who was president and chief operating officer.

The chain of franchised computer stores, the largest computer retail operation in the world, has been under siege from two fronts in recent months. A California jury declared in March that a group holding a 9-year-old note for $250,000 has the right to convert it into a 20% share of Computerland stock and also awarded $140 million in punitive damages.

But the company has also been under pressure from disgruntled franchise owners, who have sought reduced royalty fees and greater corporate support.

Millard said he was resigning his post of CEO, but will remain as chairman of the board. His daughter has also resigned, but has accepted the post of president of IMS Associates, Inc., which is also owned by Millard, and will remain a member of Computerland's board of directors.

From page 87

SIA predicts surge in semiconductor sales

meeting, Gilbert Amelio, president of Rockwell International Corp.'s Semiconductor Product Division, blamed his industry's current woes on its $2.5 billion of excess inventory. Conditions will begin to improve once that inventory starts to decline, he said. "We are beginning to burn off that inventory," Amelio said. Semiconductor executives at the SIA press conference said they agreed with the SIA's optimistic forecast, but admitted they were not ready to start growing again.

"It is clear that the inventory is being absorbed," said Charles Sporck, president of National Semiconductor Corp. "But we don't forsee going into a hiring binge."

Last year the SIA forecast was off by about 39%, predicting growth in what proved to be one of the industry's worst years. "We did not foresee the flattening of the end-user consumption," Amelio said.

Industry analysts are also predicting improvements in the semiconductor industry, but at slightly different levels. "The SIA is saying the market will improve starting in the fourth quarter. We feel that it is going to take another quarter," said Fred Zieber, senior vice-president of Dataquest, Inc.

Dataquest predicts a more modest growth, anticipating a 10% increase in chip sales next year. Some inventory building, a slight stabilization of prices and a modest increase in the electronics business will help contribute to the industry's resurgence, Zieber said.

The largest area of growth in semiconductor sales will be in the custom market, according to the SIA. Integrated circuits will represent about 77% of the total solid-state sales this year. By 1988, that figure is expected to grow to about 84% annually.

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EnerConnect is the second major micro product from Enertronics, developers of the successful EnerGraphics package. As the ad for EnerConnect says, it is "... the first software package that puts mainframe graphics capability into the hands of anyone with an IBM PC ... or 3270 PC."

When it came time to announce EnerConnect, Randy Andes decided to use *Information Week*, *Business Week*, and *Computerworld Focus*. As Randy puts it, "... we knew *Computerworld* reached the people we need to talk to from past ads for EnerGraphics, and we decided to test *Focus* because, as the name says, each issue focuses on a topic. So, we could select an appropriate editorial environment."

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Randy T. Andes, Director of Marketing, Enertronics Research, Inc., St. Louis, Missouri.

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From page 87

Apple dispute an industry reality

victim — Apple, which last May found itself in the middle of a heated row when it reduced Jobs to little more than a figurehead in his own organization.

Unhappy with this turn of events, Jobs disclosed his intention to start a second business venture and began recruiting employees from Apple's work force even before he resigned as the company's chairman. Apple's management interpreted his hiring activities and business plans as hostile and countered by naming him as a defendant in a $5 million lawsuit.

So divergent are Jobs' and Apple's outlooks on the controversy in question that neither side is very likely ever to concede much merit to the other's position. But the truth of the matter is that quarrels between established vendors and their entrepreneurial former employees seldom involve morally or intellectually unambiguous issues. Each warring party can usually make a reasonably convincing case for the validity of its particular viewpoint.

On one hand, entrenched companies have a legitimate need to protect their proprietary technology from unauthorized disclosure and should rightly be able to enjoy the hard-earned fruits of their labor and investment. If hungry entrepreneurs were allowed to abscond at will with their former employers' expertise and then use the information as a competitive weapon against its own developers, companies would quickly lose all incentive to innovate. They would thus cease to furnish their customers with useful, attractive products and would betray their stockholders' best interests.

Entrepreneurial spillage vital

On the other hand, a certain amount of entrepreneurial spillage from large, established vendors is probably vital to the high-tech field's continued growth and prosperity. Small start-up ventures often surpass even corporate giants in technological inventiveness and supply new blood that continually revitalizes the industry even when some of its major players fall gravely ill.

Existing firms may view with alarm the emergence of new entrepreneurial rivals and feel doubly threatened when the competition is spawned by their own former employees. From the narrow perspective of self-interested vendors, such attitudes are easy to understand.

But in the final analysis, rifts of the sort that recently severed Jobs' ties with Apple are natural, probably even inevitable, occurrences in certain major companies. Just as mature oak trees perpetuate their species by scattering acorns, so do a few chosen vendors contribute disproportionately to technological progress by sowing the industry soil with the seed of their own former talent.

The current Jobs-Apple clash may temporarily harm both combatants, divert their attention from more strategic concerns and create a messy, distracting sideshow for hordes of ogling bystanders. But the short-term troubles that such convulsions may create for selected individuals are usually more than offset by the long-term benefits they yield for the industry as a whole.

From page 87

Semiconductor firms call for import duties

Dunlap said at a press conference. "We can sit back and let this happen in Eproms, or we can use every means at our disposal to prevent it."

The U.S. firms say they have suffered a shrinking domestic market share as Eprom chips have become an interchangeable commodity item as dynamic random-access memory (RAM) chips did before them. The petition charges that while the U.S. market for 128K-byte Eprom chips increased seventeenfold in the past two years, U.S. vendors' share of the market has dropped by 60%.

Intel, Advanced Micro Devices and National Semiconductor said 256K-byte Eprom chips, which were selling for $17 when the Japanese "aggressively entered" the market in January 1985, now sell for less than $4 or below the alleged Japanese production cost of $6.34. Japanese 128K-byte Eprom chips fell from $7.50 to $2.50 in the same period, the petition said.

Howard Bogert, a semiconductor industry analyst with Dataquest, Inc. based in San Jose, said the petition was a last-resort move by the leading firms in the beleaguered chip industry.

"The basic bias of this industry has always been toward free trade, so this is a step not taken lightly," Bogert said. "I believe they are fearing for the survival of the semiconductor industry in the U.S. There are other steps that could help them, such as low-cost capital equipment loans from the government, but they might come too late."

In addition to Hitachi Ltd., the petition charges dumping by Mitsubishi Corp., Fujitsu Ltd., NEC Corp., Toshiba Ltd., Matsushita Electric Corp., Oki Ltd. and Ricoh Corp.

Separately, Micron Technology, which had previously filed its own antidumping petition against Japanese dynamic RAM chip makers, reported a $6.5 million pretax loss for the year ended Aug. 28. Revenue fell from $87.3 million in fiscal 1984 to $75.9 million in fiscal 1985. After a tax credit, Micron Technology earned $154,000, or 1 cent per share, compared with $28.9 million or 76 cents per share in the previous year.

The firm was hit hard by its fourth-quarter after-tax loss of $7.3 million on sales that plummeted from $37.4 million in the year-earlier period to $6.1 million.

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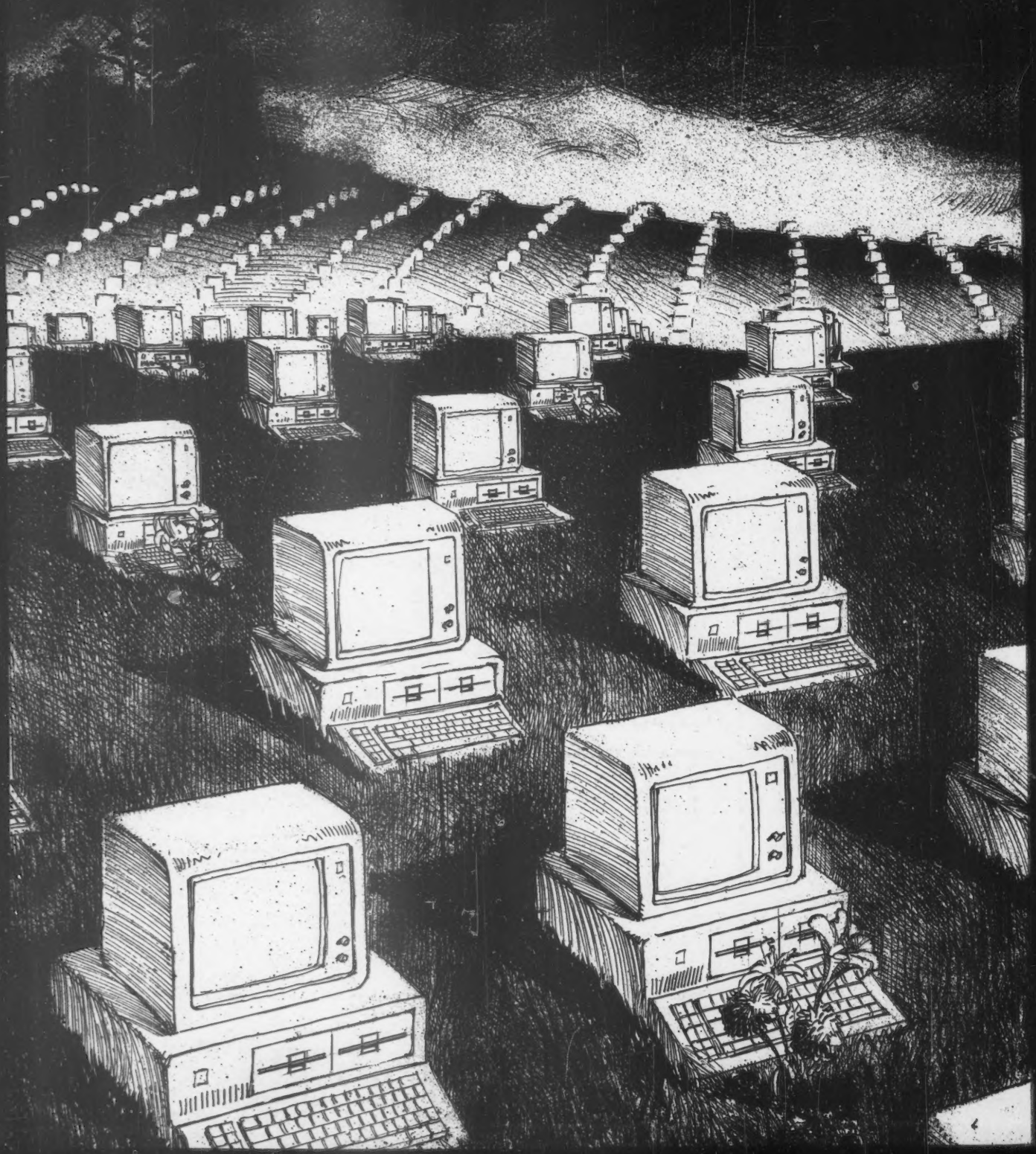

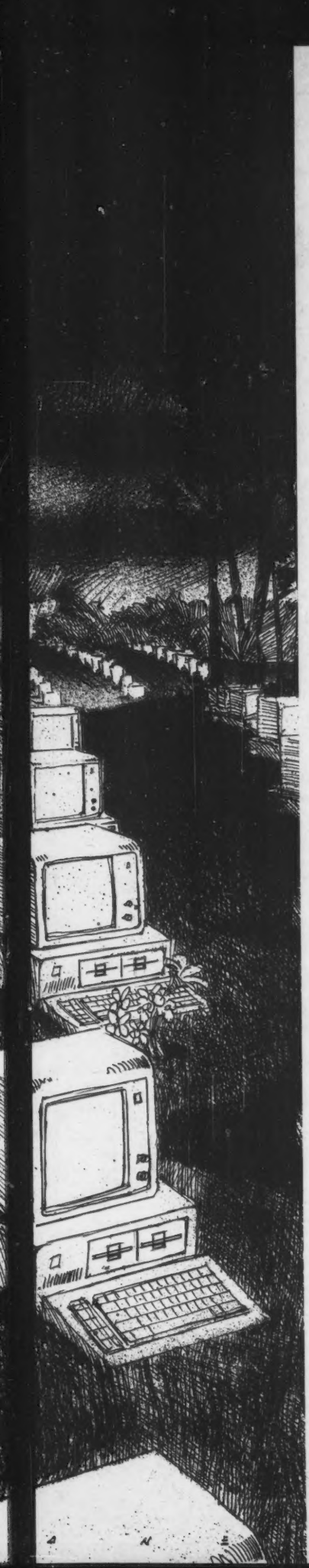

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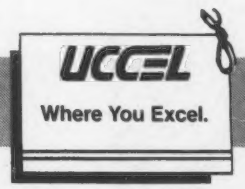

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Robert Half, staffed by EDP professionals for EDP professionals with 80 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets ..... ALL FEES ARE PAID BY CLIENT COMPANIES, OF COURSE. The following is a partial listing of opportunities and locations.

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Outstanding oppty w/major sftwr devel co. Req bkgrd in MVS, on-line monitors (SMF, CMF) strong skills in TSO & SAS. Will do product devel & research & support new sftwr. Excellent benefits & full reloc.
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CAPACITY PLANNING/MODELING

Devel oppty for indiv w/ strong CICS/IMS bkgrd, RMF /SMF exp, IPS tuning & solid MVS skills. This is a growth situation w/a mj sftwr vendor. Suburban East Coast loc.
Salary **$45-55,000**

DIRECTOR DATA BASE

Exclusive opening w/CT client expanding MIS projs! Indiv must have min 8 yrs exp w/emphasis on IMS DB/ DC design/devel projs. Demonstrated mgmt exp req'd for this newly created position. Salary **$60,000**

PROGRAMMER ANALYSTS

CT corp has immediate need for P/A's w/min 2+ yrs COBOL apps exp! Client pays full interview & reloc expenses. Prefer IBM/MVS bkgrd. Salary **$25-32,000**

INS SPEC'S

Min 2+ yrs exp w/Universal Life and/or PMS sftwr qualifies for CT area oppty's to join devel staff in on-line expansion programs.
Salary **$36,000**

IDMS

CT client expanding IDMS tech/devel staff! Exceptional growth oppty's for indiv's seeking professional, rewarding careers. Min 2 yrs IDMS req. Salaries **$36-42,000**

ROBERT HALF of Hartford
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

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EDP AUDIT MANAGER

A large state-of-the-art shop with a start-up department seeks a strong self-motivator who is a CPA with Big 8 experience. Fee Paid.
$45,000

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Outstanding, prestigious company needs a 2-year PL/1 programmer using IMS/DB as the data base. Fee Paid. **$28,000**

ROBERT HALF of Oklahoma
5840 S. Memorial, Ste. 217
Tulsa, OK 74145
(918) 627-1600

PROVIDENCE

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Rapidly expanding co seeks proj leader to plan, select, acquire & implement hardware/software for internat sub. Degree & min 5 yrs MIS exp req. S/36 knowl pref. Extensive travel. **$38,000**

ROBERT HALF of Providence
900 Turks Head Building
Providence, RI 02903
(401) 274-8700

BUFFALO

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Well-known F500 mfr in NY Southern Tier seeks a "promotable" sr analyst to lead major projs in fin'l & mfg arena. Req 4 yrs degree & min 6 yrs of impressive career achievements. Excellent growth oppty. Beautiful living area. To **$47,000**

ROBERT HALF of Buffalo
420 Main Street
1310 Liberty Building
Buffalo, NY 14202
(716) 842-0801

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Leading sub of nat mfr seeks well-versed P/A for new invty & fin'l apps devel. Previous PDP-11 or VAX, BASIC, BASIC+ required. Oppty to join a small MIS group w/ visibility to corp mgmt.
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WANG VS COBOL

This exciting fin'l/leasing/ invest co seeks cream-of-the-crop Wang COBOL P/A. Multiple Wang VS 100 COBOL shop incl the latest in networking + PC's. Unique fast growth MIS dept offers career catalyst for continued new apps devel projs. Outstanding benefits & bonus plan. **$30,000**

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100 Summer Street
Boston, MA 02110
(617) 423-1200

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522 Fifth Avenue
New York, NY 10036
(212) 221-6500

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George Waterman
ROBERT HALF of Kansas City
127 W. 10th Street
Kansas City, MO 64105
(816) 474-4583

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Financial applications group in a large service organization has an immediate need for an experienced Prog/ Analyst who has had responsibility for Accounting Systems. Any packaged software exposure a definite plus, any CICS or similar on-line would be helpful. Shop supports MVS/XA and IDMS. Excellent visibility & bonus plan. Salary to Hi **$30's**

MVS SOFTWARE PROGRAMMER CENTRAL ILLINOIS

Rural Central Illinois location! Major service corp is looking for a 4+ yr BAL/MVS/JES 2 software programmer to handle software support and performance monitoring. Excellent benefits and relo pkg.
Salary to **Hi $30's**

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(213) 386-6805

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7171 Mercy Road
Omaha, NE 68106
(402) 397-8107

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SYSTEMS ANALYST

Growing DP shop needs sharp candidate with good IMS or CICS skills. Must come from IBM OS environment with previous COBOL experience. Mid **$30,s**

ROBERT HALF of Tennessee
1101 Kermit Dr., Ste. 407
Nashville, TN 37217
(615) 361-4900

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SYSTEMS ANALYST

Challenging positions for Sys Analysts with OS/MVS/ XA, COBOL, IMS DB/DC. Also helpful if insurance background. Excellent relo package. **$40,000**

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ROBERT HALF of San Antonio
6243 IH 10 West, Suite 850
San Antonio, TX 78201
1-800-531-5402
In TX dial (512) 736-2467

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Minneapolis, MN 55402
(612) 239-9001

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New Orleans, LA 70157
(504) 835-4296

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Ed Lance or Dick Bird
ROBERT HALF of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414)271-HALF (271-4253)

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Minimum 2 yrs edp audit exp in IBM shop.
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Terence H. White
ROBERT HALF of Atlanta
3379 Peachtree Rd., N.E.
P.O. Box 10201
Atlanta, GA 30319
(404) 266-2153

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Marjie Peterson
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Seattle, WA 98101
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Washington, DC 20814
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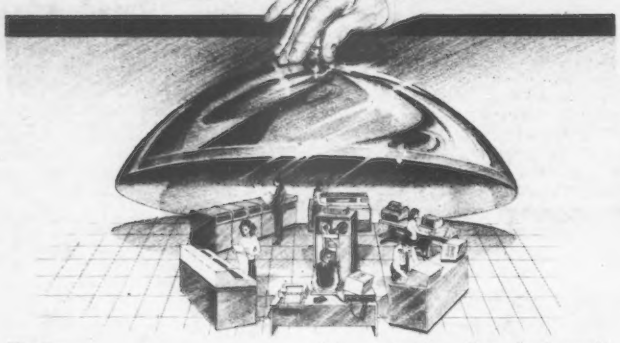

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DATABASE ANALYST

BS required. Min. 5 yrs. total experience in DP and 3 years in database work. Need to have experience as a database specialist in at least one installation operating under IBM MVS or VS/1 operating systems. Must have experience in an IBM DBMS such as ADABAS, IMS, IDMS, Total, etc. Must have experience in data analysis and normalization and in use of data dictionaries.

We offer an excellent benefit package including medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume, with present salary history, to Personnel Dept. 10/7, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Ave., Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. Principals only apply.

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SENIOR SYSTEMS PROGRAMMERS

SYSTEMS PROGRAMMERS

MVS/XA; Performance Tuning; Capacity Planning; Telecommunications with ACF/VTAM/NCP/CICS; System 38/MVS Distributed Processing.

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Experienced in System 38 development distributed in a mainframe environment using COBOL and RPGIII. Minimum of 3 years experience required.

Located in the beautiful Maryland suburbs, you will enjoy all the benefits a superior company has to offer including medical/dental, 401K, continued training, relocation assistance, not to mention flexible working hours. Salaries to the mid $50k range.

Hopefully, you are beginning to share some of our excitement. To learn more about it, send your resume to Box CW-B4698, Computerworld, Box 880, Framingham, Ma. 01701. We will respond in complete confidence to every resume.

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Reporting to the systems software manager, install, develop and modify software programs in support of applications programmers. Position requires at least one year as a systems programmer in an MVS/SP or XA environment working with SMP/E, JES2 and ROSCOE. Performance evaluation and tuning experience would be a plus.

We offer a competitive salary and benefits package, congenial working conditions, and an opportunity to grow in an expanding MVS/XA operating environment on an IBM 3083.

Send resume to:

Human Resources Dept.
Willamette Savings & Loan
100 S.W. Market St.
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New Mexico State University Computer Center is seeking candidates for the position of Systems Programmer III. NMSU supports MVS and VM/CMS in a multiple CPU environment (AMDAHL V6 and IBM 3081). A Bachelor's degree in a scientific or computer discipline is desired, but a suitable combination of coursework and experience may be substituted for this requirement. At least one year of experience with MVS and/or VM is required. Additional experience with Networking, UNIX or DEC systems would be helpful. The starting date will be November 15, 1985, or ASAP. The salary range is $24,000 to $32,000. Benefits include 22 days of annual leave. Application deadline is October 25, 1985. Send application and resume to T. Duttle, NMSU Computer Center, Box 3AT, Las Cruces, New Mexico 88003. Minorities and females are urged to apply.

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American Express, a leader in the growing financial services industry, has an excellent opportunity available in our Network Systems Department. Due to rapid growth, we have an immediate need for an individual who will provide IBM 8100 application development and support.

This position requires 1-2 years experience in DPCX Assembler Macro language programming, including field by field and full-screen processing, along with in-depth knowledge of DPCX/DOSF. Additionally, experience with SPF under TSO, and a thorough working knowledge of JCL and utilities are required.

Our Network area offers excellent growth opportunities for the performance-minded individual, along with the exciting challenges found in a dynamic, state-of-the-art data communications environment.

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Your name, resume, and present employer will not be given out without your permission.
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Experience with Burroughs protocols (NDL or NDLII) or IBM SNA, RJE is required. At least 3 years' of technical involvement with software data communications support and troubleshooting is needed. Knowledge of IBM S/38 Data Communications (APPC) and hardware configuration experience is preferred, but not required.

We offer a competitive salary and a full range of benefits. For consideration please send resume in confidence to:

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The companies listed above have 1,304 positions available for this year. Upon receipt of your application, CSI will match your qualifications against the job specifications outlined by our corporate clients. You will receive confirmation of your application, plus details on all companies with applicable job opportunities as they arise. Upon receipt of your application, we will also prepare for you—free of charge—a personalized salary comparison, relating your current position and compensation to other professionals in your field.

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Confidentiality Options (Check one):
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Minimum asking compensation: $_____ per year. Are you willing to relocate? ☐ Yes ☐ No

How soon could you start a new position? ☐ Immediately ☐ Other _____

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School	Major	Degree	Year	No Degree
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				☐

Honors, Awards, Professional Registrations, or Licenses: _____

SUMMARY OF PROFESSIONAL EXPERIENCE:

Primary Occupation: ☐ Data Processing ☐ Engineering ☐ Finance/ Accounting Number of years in primary occupation _____

1) Current or most recent job title: _____

Dates: __ __ / __ __ to __ __ / __ __ Current Compensation $_____

Company Name: _____ City _____ State __ __

Responsibilities: _____

Accomplishments: _____

2) First previous job title: _____ Dates: __ __ / __ __ to __ __ / __ __

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Responsibilities: _____

Accomplishments: _____

Statement of Job/ Career Objectives: _____

CPW 02

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- COBOL, PL/I, FORTRAN, MARK IV, BAL
- OS/DOS, TSO/SPF, ROSCOE, VM/CMS, PACBASE, ACCOLADE

Send your resume with salary history to: General Electric Consulting Services Corporation, 12 South 12th Street, Suite 3040, Philadelphia, PA, 19107, or call E. Meltzer at (215) 625-9300.

Positions are also available in our other regional offices listed below.

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We have an excellent opportunity in our Operating Systems Department in Manchester, NH for a highly motivated Systems Programmer. The successful candidate will support, install and maintain IBM System Software, as well as evaluate new products. To qualify, you must have a minimum of 5 years' systems programming experience and be familiar with OS/MVS. Telecommunications experience would be beneficial.

Please forward your resume with salary history to M. Alana Demers, Employment and Training Manager, Public Service of New Hampshire, P.O. Box 330, 1000 Elm Street, Manchester, New Hampshire 03105

An Equal Opportunity Employer M/F

PSNH

DATA PROCESSING

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The Data Communications position requires experience with X.25, MVS/XA (or at least OS/370), VTAM/NCP and network operation. Experience with NPSI, DCA/355, NCCF and 3725 is desirable.

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Linda Kobel • Personnel Supervisor
1100 Circle 75 Parkway • Atlanta, GA 30339

INPO

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- CICS, IMS, DL/1, OS/MVS

Team leadership or supervisory experience highly desired. Experience with medical application systems, particularly PCS/ADS, is a plus.

Martin Marietta Data Systems offers a comprehensive compensation package, a stimulating professional environment, and the opportunity to advance as far as your initiative will allow. For immediate consideration, send your resume including salary history/requirements in confidence to: Martin Marietta Data Systems, Personnel Dept., 6303 Ivy Lane, Dept. SB-16, Greenbelt, MD 20770.

MARTIN MARIETTA DATA SYSTEMS

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DATA PROCESSING PRIME INFORMATION

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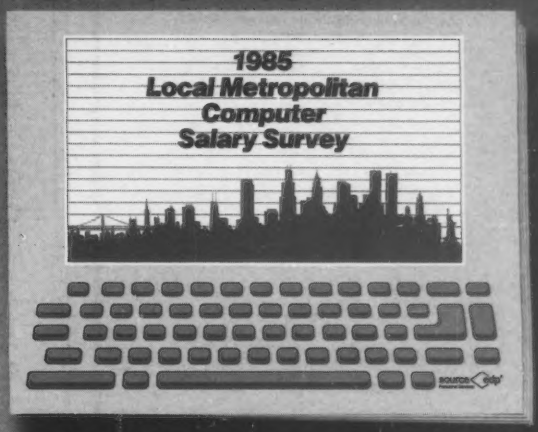

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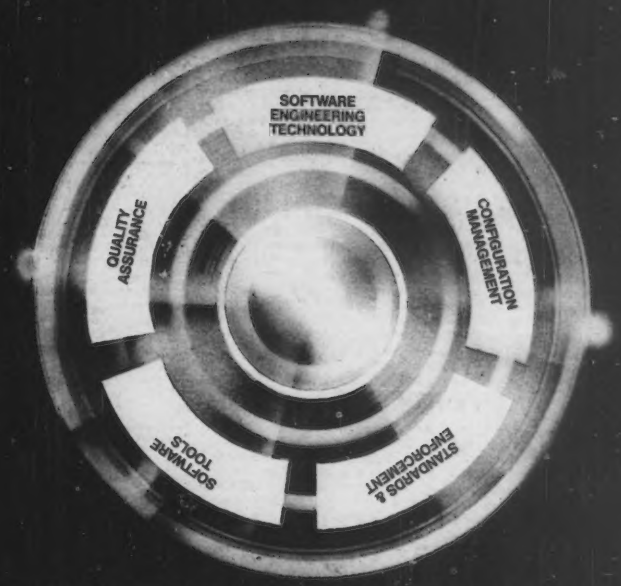

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Qualified candidates will have a minimum of 3 years of COBOL programming and one year of systems analysis. Also, experience in developing application software on a large scale IBM system utilizing OS/MVS required. CICS, TSO or DBMS knowledge highly desirable. Life insurance experience desirable. Candidates must demonstrate good communication skills and ability to assume project leadership roles.

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- Ben Franklin Advanced Technology Center
- LEHIGH UNIVERSITY

The Ben Franklin Advanced Technology Center at Lehigh University invites applications for the position of Computer Aided Design and Computer Aided Manufacturing (CAD/CAM) Projects Manager. The successful candidate will initiate, monitor and assist in cooperative University/industry research and development efforts in CAD/CAM, CIM and related design and manufacturing technology; consult with industries to plan and implement CIM; to teach seminars and short courses on related topics; and initiate other activities to support and foster the application of these modern technologies. QUALIFICATIONS: Master's degree in related discipline and 3-5 years of applications experience. Knowledge of data base systems, networking and/or electronics manufacturing is desirable. Competitive salary and excellent benefits. Send letter of application and resume to:

Mark S. Lang, Associate Director, NET Ben Franklin Technology Center, LEHIGH UNIVERSITY, Murray H. Goodman Campus, #125, Bethlehem, PA 18015.

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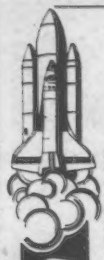

Innovation

FLORIDA OPPORTUNITIES

Lockheed Space Operations Company (LSOC) is the prime contractor to NASA and the U.S. Air Force for the Shuttle Processing Contract. This long-range contract involves our employees in the support engineering of the orbiters' on-board equipment and associated ground support systems. We presently have a number of special opportunities for Computer Professionals having the appropriate experience and qualifications in the following areas:

DB DESIGN SPECIALIST

The candidate selected for this DB design specialist assignment will have an in-depth background demonstrating the ability to assume direct responsibility for the design of large DB structures which are employed in a high volume, on-line, transaction-oriented environment. We require three or more years' experience in DB Design utilizing Cullinet IDMS or Honeywell IDS II DB software. Further working knowledge will involve through-put consideration, clustering techniques, as well as effective sizing knowledge. A background in Honeywell is preferred, however, IDMS with Cullinet is also sought.

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REAL-TIME SCIENTIFIC

This opportunity will afford you a unique step into the Manned Space Program. You will be involved in the software support of our real-time launch process systems, which is a distributed network of over 500 minicomputers utilizing FORTRAN and a space system unique software (GOAL). Qualified candidates will have a background of real-time data acquisitions within a multicomputer environment.

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Lockheed Space Operations Company is located in the Florida Space Coast resort area. These high level career opportunities offer a very competitive salary and benefits package that is untaxed by either state or local income taxes. If you are qualified in any of the above areas and are interested in sharing in the adventure of the exciting space program, we suggest that you call Mr. Don Quirk collect at (305) 268-4070 or send your resume in confidence to: LOCKHEED SPACE OPERATIONS COMPANY, P.O. Box 2807, Titusville, FL 32781-2807.

Lockheed
Space Operations Company

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American Founders Life
American Founders Life Plaza
Department CW
P.O. Box 14500
Austin, Texas 78761

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Manufacturer located in North Mississippi is in the process of revamping our entire manufacturing system. Seeking senior people with 2-5 years manufacturing experience. The MRP system we are implementing is UNIS-1100. COBOL, TIP and DMS-1100 experience preferred. Send resume with salary history to:

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SYSTEMS ANALYST - Design, implementation, maintenance & enhancement of computer applications for various businesses. Proficiency in COBOL, PL/1, IMS/VS, TSO/SPF, IMS/VS. $30,200/yr 40 hrs/wk. Min requirements: B.S. in Math or Computer Science, 3 yrs exp or 3 yrs related programming exp. Send resume to NYS Job Service, J.O. #8019803, 485 Fifth Ave., NY, NY 10017. D.O.T. 012.167-066.

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With computer science and math background needed to design logic and coding of programs. Applicant will monitor line activity, handle channel and communication error statistics log; configure system diskette and debug programs. Applicant must have bachelor's degree (B.A.) in computer science plus have familiarity with: PLM-66, 8086/8087/8088 assembly languages; Cyber computer systems and MICROSOFT; DOS. Salary is $12.35 per hour. Job # 5-89. Send resume to: Dick Hewetson, Minnesota Department of Economic Security, 309 Second Avenue South, Minneapolis, MN 55401.

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Applicants must possess a BS degree plus 2 years' experience in APL and strong analytical skills. Experience with TSO/SPF is highly desirable. We also have openings for candidates with a BS degree and 2-3 years' experience with IMS and COBOL.

Kalamazoo is a medium-sized Southwestern Michigan community with immediate access to a mix of excellent cultural, educational and recreational pursuits including numerous lakes and a four-season climate. Upjohn offers a competitive salary commensurate with experience and an outstanding benefits program.

For confidential consideration, please call toll-free 1-800-253-8600, ext. 3-6767 (inside Michigan collect 616-323-6767) to request an employment application. Please refer to ad number **18362-E** when calling.

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Will coordinate all Sperry activities on-site, serving as interface between customer and Sperry management; will supervise one additional Sperry Support Analyst on-site, and will perform first level exec dump analysis. Must possess a minimum of 5 years direct experience with 1100 systems to include 3 years executive internalist support. Effective oral and written communication skills required.

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Middle South Services, Inc., the high technology service arm of the Middle South Utilities System, is seeking high caliber Tandem Professionals.

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- 3+ years in Data Processing
- High level language business applications programming
- DBMS
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4321	0.25	1	*4381-3	4.0	8 to 32
4331-1	0.25	0.5 to 1	3083E	4.2	8 to 32
4331-11	0.38	1 to 2	3033N	4.3	4 to 16
4331-2	0.50	1 to 4	3083EX	4.4	8 to 32
4341-9	0.52	1 to 4	3033UP	5.0	4 to 24
4361-3	0.70	2 to 4	3083B	6.3	8 to 32
4341-10	0.75	2 to 4	3083BX	6.6	8 to 32
4341-1	0.88	2 to 4	3083J	8.4	8 to 32
4341-11	1.1	2 to 8	3033MP	8.5	8 to 32
4361-4	1.15	2 to 12	3033AP	8.5	4 to 24
3031	1.2	2 to 8	3083JX	8.8	8 to 32
4361-5	1.45	2 to 12	3081D	10.0	16 to 32
4341-2	1.5	2 to 16	3081G	11.0	16 to 48
4341-12	1.65	2 to 16	3081GX	11.9	16 to 64
3031AP	2.0	2 to 8	3081K	14.0	16 to 48
4381-1	2.1	4 to 16	3081KX	15.5	16 to 64
3032	2.5	2 to 8	3084Q	26.6	32 to 96
4381-2	2.7	4 to 32	3084QX	28.7	32 to 128
3033S	2.9	4 to 16	†3090-200	29.4	64 to 192
†3083CX	3.3	8 to 32	†3090-400	52.9	128 to 384

*First installation 1984 †First installation 1987

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SYSTEMS	MIPS	MEGABYTES
470V/7A	4.5	8 to 32
470W/7	5.5	8 to 32
470V/8	6.5	8 to 32
5840	8.4	16 to 64
5850	11.6	16 to 64
5860	14.0	16 to 64
5867	22.0	24 to 64
5868	22.0	32 to 128
5870	26.6	16 to 64
5880	26.6	32 to 128

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AS/8043	5.2	8 to 32
AS/8053	6.5	8 to 32
AS/8063	8.4	16 to 32
AS/9040	7.2	8 to 48
AS/9050	9	8 to 48
AS/9060	11.2	16 to 64
AS/9070	16.2	16 to 64
AS/9080	20	16 to 64
†AS/XL-60	28	32 to 256
†AS/XL-80	50	64 to 256

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The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware/software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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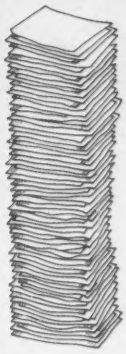

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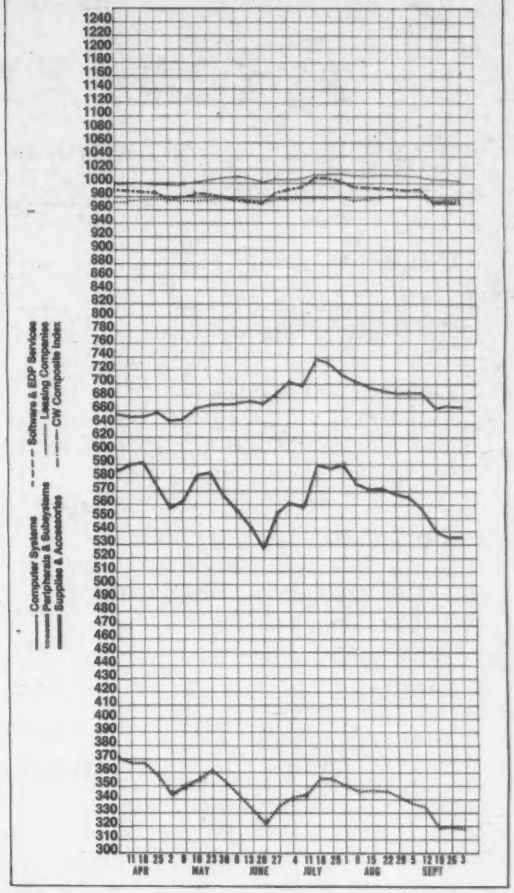

Computerworld Stock Trading Summary

TRADE QUOTES

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CLOSING PRICES WEDNESDAY, OCTOBER 2, 1985

COMPUTER SYSTEMS

E C H		1985 RANGE (1)	CLOSE OCT 2 1985	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	5- 12	5 3/8	+ 1/4	+4.8
O	ALTOS COMPUTER SYST	7- 14	10	- 1/2	-4.7
A	AMDAHL CORP	10- 18	11 1/4	- 7/8	-7.2
O	APPLE COMPUTER INC	14- 31	15 3/8	- 1/4	+1.5
N	AT&T	19- 29	21 1/4	+ 3/8	+1.7
N	BURROUGHS CORP	51- 68	84 1/8	+1 3/4	+2.6
O	COMPAQ COMPUTER CP	4- 12	9 3/8	- 1/8	-1.3
O	COMPUTER AUTOMATION	3- 9	9 1/2	0	0.0
A	COMPUTER CONSOLES	5- 20	8 5/8	0	0.0
N	CONTROL DATA CORP	18- 38	13 3/8	-2 3/8	-13.1
O	CONVERGENT TECHNOL	5- 17	9 1/8	+ 3/8	+4.8
O	CPT CORP	5- 12	9 5/8	- 9/8	-10.0
N	CRAY RESEARCH INC	23- 31	48 3/4	+1 1/4	+2.6
O	DAISY SYSTEMS CORP	21- 38	22	- 1/4	-1.1
N	DATA GENERAL CORP	31- 76	38 1/2	- 3/8	+0.8
N	DATAPOINT CORP	5- 23	4 3/4	+ 1/8	+2.7
N	DIGITAL EQUIPMENT	89-128	109 3/4	+2 1/8	+1.8
A	EECO INC	12- 18	14 3/8	- 1/8	-0.8
N	ELECTRONIC ASSOC.	3- 6	4 3/8	- 1/8	-2.7
N	FLOATING POINT SYST	15- 35	28 1/4	+1 1/8	+4.4
N	FOXBORO	24- 34	25	- 1/4	-0.9
N	GOULD INC	20- 32	30 3/8	+3 7/8	+14.4
N	HARRIS CORP	24- 35	23 3/4	- 1/8	-0.5
N	HEWLETT-PACKARD CO	31- 44	32 1/2	+ 1/2	+1.5
N	HONEYWELL INC	53- 87	61 1/2	0	0.0
N	IBM	118-138	124 3/8	+ 3/8	+0.3
O	IPL SYSTEMS INC	1- 4	1 5/8	0	0.0
N	ITT CORP	24- 37	34 1/4	+1 7/8	+5.7
N	M/A-COM INC	18- 26	17 1/8	- 1/4	-1.4
N	MANAGEMENT ASSIST	1- 3	3	+ 3/8	+14.2
N	MATSUSHITA ELEC(ADR)	48- 68	51 1/2	+ 9/8	+1.2
N	MODULAR COMPUTER SYS	6- 10	6 1/8	0	0.0
O	MOHAWK DATA SCI	2- 11	1 3/4	0	0.0
N	MOTOROLA INC	28- 44	34	+ 1/4	+0.7
N	NAT'L SEMICONDUCTOR	10- 17	11 7/8	- 5/8	-5.0
N	NBI INC	13- 21	13 3/4	+1 3/4	+11.2
N	NCR	23- 36	33 7/8	+1 3/4	+5.4
N	PERKIN-ELMER	22- 30	24 1/8	-1 1/2	-5.8
N	PRIME COMPUTER INC	15- 20	18 3/4	- 1/4	-1.4
N	SPERRY CORP	35- 59	50 3/4	+2 1/2	+5.1
O	STRATUS COMPUTER INC	6- 18	18 3/4	+ 1/2	+3.0
O	TANDEM COMPUTERS INC	14- 29	14 3/4	+ 3/8	+4.4
N	TANDY CORP	24- 37	33	- 5/8	+1.9
O	TELEVIDEO SYSTEMS	2- 7	2	- 1/8	-5.8
O	TELXON CORP	7- 16	15 1/4	+ 1/2	+3.3
N	TEXAS INSTRUMENTS	94-148	83 1/4	+ 1/4	+0.2
A	ULTIMATE CORP	8- 24	11 5/8	0	0.0
O	VECTOR GRAPHICS INC	1- 1	1	0	0.0
A	WANG LABS "B"	15- 32	18 3/8	+ 1/8	+0.7
A	WANG LABS "C"	15- 32	18 1/4	- 1/2	-2.8
N	XEROX CORP	47- 56	48 3/8	-1 7/8	-3.7

LEASING COMPANIES

N	COMDISCO INC	9- 20	20 1/4	+1 1/2	+8.0
O	CONTINENTAL INFO SYS	5- 12	10 1/8	- 1/8	-1.2
O	FINALCO GROUP INC	3- 7	4 1/2	- 3/8	-7.8
O	PHOENIX AMERICAN INC	2- 8	8 1/4	+ 1/8	+3.0
O	SELECTERM INC	6- 14	7 3/4	- 1/2	-8.0
N	U.S. LEASING	32- 43	32 1/8	+ 3/8	+1.1

COMPONENTS

N	ADVANCED MICRO DEV	23- 41	24 1/4	-2	-7.6
O	ADV'D SEMICONDUCTOR	9- 25	8 5/8	+1 1/8	+15.0
N	ANALOG DEVICES INC	18- 25	20 3/8	- 5/8	-2.9
O	ANALOGIC CORP	9- 18	12	0	0.0
N	APPLIED MAGNETICS CP	9- 18	12 1/8	0	0.0
O	HADCO CORP	3- 10	4 1/8	0	0.0
O	MICRO MASK INC	8- 14	6	- 3/8	-5.8
N	TERADYNE	20- 39	18 3/4	-1 1/4	-6.2

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O	ADVANCED COMP TECH	2- 4	3 1/4	+ 1/8	+4.0
N	ADVANCED SYSTEMS INC	8- 20	13 1/2	- 1/2	-3.5
N	AGS COMPUTERS INC	10- 17	15 3/8	- 1/2	-3.1
O	AMERICAN SOFTWARE	7- 15	10	0	0.0
N	AMACOMP INC	1- 4	3	0	0.0
O	ANALYSTS INTL CORP	5- 11	9 1/4	+ 1/4	+3.1
N	APPLIED DATA RES	20- 40	18 3/4	0	0.0
O	ASHTON TATE	8- 13	12 3/8	+ 1/2	+4.2
O	ASK COMPUTER SYSTEMS	10- 24	11 1/4	- 1/4	-2.1
N	AUTRADYNE CORP IND	1- 7	1 3/4	- 1/8	-6.6
N	AUTOMATIC DATA PROC	35- 53	50 1/4	- 3/8	-1.2
O	COMPUTER ASSOC INT'L	18- 30	24	-1 1/2	-5.8
O	COMPUTER HORIZONS	5- 11	11 1/8	- 1/4	-2.1
O	COMPUTER METWORK	3- 10	7 1/4	+ 1/4	+3.5
N	COMPUTER SCIENCES	12- 24	24 3/8	+ 5/8	+2.8
O	COMPUTER TASK GROUP	10- 20	18 1/8	+ 3/8	+2.1
O	COMPUTER USAGE	1- 3	2 1/4	- 1/4	-10.0
O	COMPUTONE SYSTEMS	4- 11	5 1/2	+ 1/8	+2.3
O	COMSERV CORP	1- 8	2 7/8	0	0.0
O	COMSHARE	6- 10	8 7/8	0	0.0
N	CULLINET SOFTWARE	18- 33	18 1/2	- 1/2	-2.9
O	CYCARE SYSTEMS INC	18- 27	21 1/4	+1	+4.9
O	HOGAN SYSTEM INC	4- 15	5 3/8	+ 1/8	+2.3
N	GENERAL ELECTRIC CO	53- 65	58	+ 3/4	+1.3
N	GEN. MOTORS E (EDS)	17- 47	37 1/8	- 3/4	-1.8
N	GTE CORP	30- 45	38 1/4	+ 3/8	+1.8
O	INFORMATION SCIENCE	1- 5	1 3/4	- 1/4	-12.5
O	INFOTRON SYSTEMS CP	15- 35	17	- 1/4	-1.4
O	KEANE ASSOCIATES	8- 18	13	-1	-7.1
N	LOGICON	24- 38	33 1/2	- 1/4	-0.7
O	LOTUS DEVELOPMENT CP	18- 34	18 1/4	-2 1/2	-13.3
O	MCI COMMUNICATIONS	7- 11	8 5/8	- 1/8	-1.4
O	MAGT SCI AMER INC	8- 18	8 7/8	-3 3/8	-27.5
O	MATHEMATICAL APP GRP	2- 8	1 3/4	0	0.0
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O	MICROPRO INT'L CP	2- 4	2 3/8	0	0.0
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O	ON-LINE SOFTWARE INT	4- 10	8	- 1/2	-7.8
O	PANSOPHIC SYSTEMS	11- 25	18 1/2	- 3/4	-3.7
N	PLANNING RESEARCH	9- 17	16 3/4	+ 3/4	+4.6
O	POLICY MGMT SYSTS CP	18- 35	18 1/2	+1	+5.7
O	PROGRAMMING & SYS	4- 6	5 3/4	- 1/8	-2.1
O	REYNOLDS & REYNOLD	29- 44	37 1/2	+1 1/4	+3.4
O	SEI CORP	11- 18	18 1/2	0	0.0
O	SHARED MEDICAL SYST	24- 35	32 5/8	-1 7/8	-5.4
O	SCIENTIFIC COMPUTERS	5- 12	5 7/8	+ 1/8	+2.1
O	SOFTWARE AG	11- 22	13 7/8	-2	-12.9
N	URS CORP	10- 14	11 3/8	- 1/8	-1.0
N	UCCEL	9- 17	15 3/8	-1	-6.1

PERIPHERALS & SUBSYSTEMS

P	AM INTERNATIONAL	3- 8	3 3/8	- 1/8	-3.5
A	ANDERSON JACOBSON	2- 11	2 1/4	- 1/4	-10.0
O	AST RESEARCH INC	7- 23	14 7/8	+ 1/8	+0.8
O	AUTO-TROL TECHNOLOGY	5- 15	5 1/4	- 3/8	-6.6
O	AVANT-GARDE COMPUTNG	6- 28	8 1/2	+ 1/2	+6.2
O	BANCTEC INC	5- 12	8 5/8	0	0.0
O	BEEHIVE INT'L	1- 2	3/8	+ 1/8	+50.0
N	BOLT-BERANEK & NEM	18- 31	28 1/4	+ 1/2	+1.7
O	CAMBEX CORP	1- 3	1	0	0.0
N	CENTRONICS DATA COMP	3- 12	4 1/2	+ 1/8	+2.8
A	CETEC CORP	6- 10	7 1/8	- 1/8	-1.7
A	COGNITRONICS	4- 7	4 3/4	+ 1/8	+2.7
N	COMPUGRAPHIC CORP	24- 37	24 3/4	+ 1/2	+2.0
O	COMPUTER TRANSCEIVER	1- 4	5/8	0	0.0
N	COMPUTERVISION CORP	12- 46	11 7/8	+ 1/4	+2.1
N	CONRAC CORP	13- 18	13 1/8	+ 1/8	+1.3
A	DATAPRODUCTS CORP	11- 24	12	0	0.0
A	DATARAM CORP	3- 7	3 3/4	- 1/4	-6.1
O	DATA SWITCH CORP	4- 8	5 3/8	0	0.0
O	DATUM INC	5- 8	6 1/8	- 1/8	-2.0
O	DECISION DATA COMPUT	8- 18	11 3/8	+1 3/8	+13.4
O	ENDATA, INC	3- 25	3 1/4	+ 1/8	+4.0
O	EVANS & SUTHERLAND	8- 18	18	0	0.0
O	GANDALF TECHNOLOGIES	5- 20	5 3/8	0	0.0
N	GEN'L DATA COMM IND	11- 35	11 1/8	- 1/8	-1.1
N	HAZELTINE CORP	3- 28	25 7/8	+ 7/8	+1.8
O	ICOT CORP	8- 17	8 1/8	+ 1/8	+2.0
O	INFORMATION INTL INC	4- 15	13 3/4	- 1/4	-1.7
O	INTECOM INC	5- 38	8 1/4	+ 3/8	+7.8
O	INTEL CORP	7- 28	24 3/4	+ 1/2	+1.9
A	LUNDY ELECTRONICS	4- 14	11 1/8	- 7/8	-7.2
O	MEGADATA CORP	4- 13	4 1/4	0	0.0
A	MEI DATA CORP	8- 30	9	+ 1/8	+1.4
N	NASHUA CORP	15- 27	25 7/8	- 1/4	-0.9
O	NETWORK SYSTEMS CORP	24- 45	24 1/2	+ 1/8	+1.5
N	NO AMERICAN PHILIPS	30- 42	33 7/8	+ 1/8	+0.3
N	NORTHERN TELECOM LTD	1- 38	33 3/8	+ 3/4	+2.8
O	OMEX	1- 3	1/2	+ 1/8	+33.3
A	PARADYNE CORP	8- 16	7 1/2	- 7/8	-10.6
A	PENRIL CORP	8- 28	8	+ 1/2	+6.6
N	PLESSEY CO (ADR)	8- 23	20 3/8	-1 1/8	-5.8
O	PRINTRONIX INC	6- 17	11 1/2	- 1/8	+1.0
O	QMS INC	3- 11	8 1/2	+ 1/4	+2.7
O	RANTEK CORP	3- 17	7 7/8	- 1/8	+6.1
N	RECOGNITION EQUIP	8- 31	8 1/4	+ 1/8	+1.3
N	SANDERS ASSOCIATES	11- 37	33 3/4	- 5/8	-1.7
O	SCAN-TRON CORP	8- 16	15 1/4	0	0.0
N	SCIENTIFIC ATLANTA	6- 14	13 1/8	+ 1/4	+2.1
O	SEAGATE TECHNOLOGY	2- 12	5 7/8	0	0.0
N	STORAGE TECHNOLOGY	1- 3	1 7/8	- 1/8	-6.2
O	SYKES DATATRONICS	0- 11	1/8	- 1/16	-33.3
A	T BAR INC	5- 20	8	+ 1/8	+2.1
A	TAB PRODUCTS CO	4- 18	18 3/8	- 1/4	-1.4
O	TANDON CORP	2- 13	3	- 1/2	-14.2
A	TEC INC	0- 88	6	- 1/2	-7.6
N	TEKTRONIX INC	30- 83	48 7/8	- 3/4	-1.4
N	TELEX	1- 45	44 5/8	+ 1/2	+1.1
O	TESDATA SYSTEMS CP	1- 23	1/2	- 3/8	-42.8
N	TIMEPLEX INC	5- 21	18 3/4	+ 1/8	+0.6
N	TITAN CORP	3- 8	8 1/8	0	0.0
O	VISUAL TECHNOLOGY	1- 10	7/8	- 1/8	-18.6

SUPPLIES & ACCESSORIES

N	AMERICAN BUS PRODS	21- 28	25 7/8	0	0.0
N	BARRY WRIGHT	17- 33	17	-2 1/2	-12.8
A	DUPLEX PRODUCTS INC	12- 20	18 1/4	+ 5/8	+3.5
N	ENNIS BUS. FORMS	10- 20	16 3/4	-1 1/2	-8.2
N	3M COMPANY	74- 88	76 3/8	+1 3/4	+2.3
N	MOORE CORP LTD	13- 22	18 1/4	+ 5/8	+3.5
O	STANDARD REGISTER	18- 38	34	+1 3/4	+5.4
N	WALLACE COMP SERVICE	28- 40	34 1/8	+ 7/8	+2.6

A few smart reasons to buy our smart modem:

Features	Ven-Tel 1200 PLUS	Hayes
1200 and 300 baud, auto-dial, auto-answer	Yes	Yes
Compatible with "AT" command set	Yes	Yes
Can be used with CROSSTALK-XVI or Smartcom II software	Yes	Yes
Regulated DC power pack for cool, reliable operation	Yes	**No**
Eight indicator lights to display modem status	Yes	Yes
Speaker to monitor call progress	Yes	Yes
Attractive, compact aluminum case	Yes	Yes
Two built-in phone connectors	Yes	**No**
Compatible with The Source and Dow Jones News Retrieval	Yes	Yes
Unattended remote test capability	Yes	**No**
Phone cable included	Yes	Yes
Availability	Now	
Price	**$499**	**$599**

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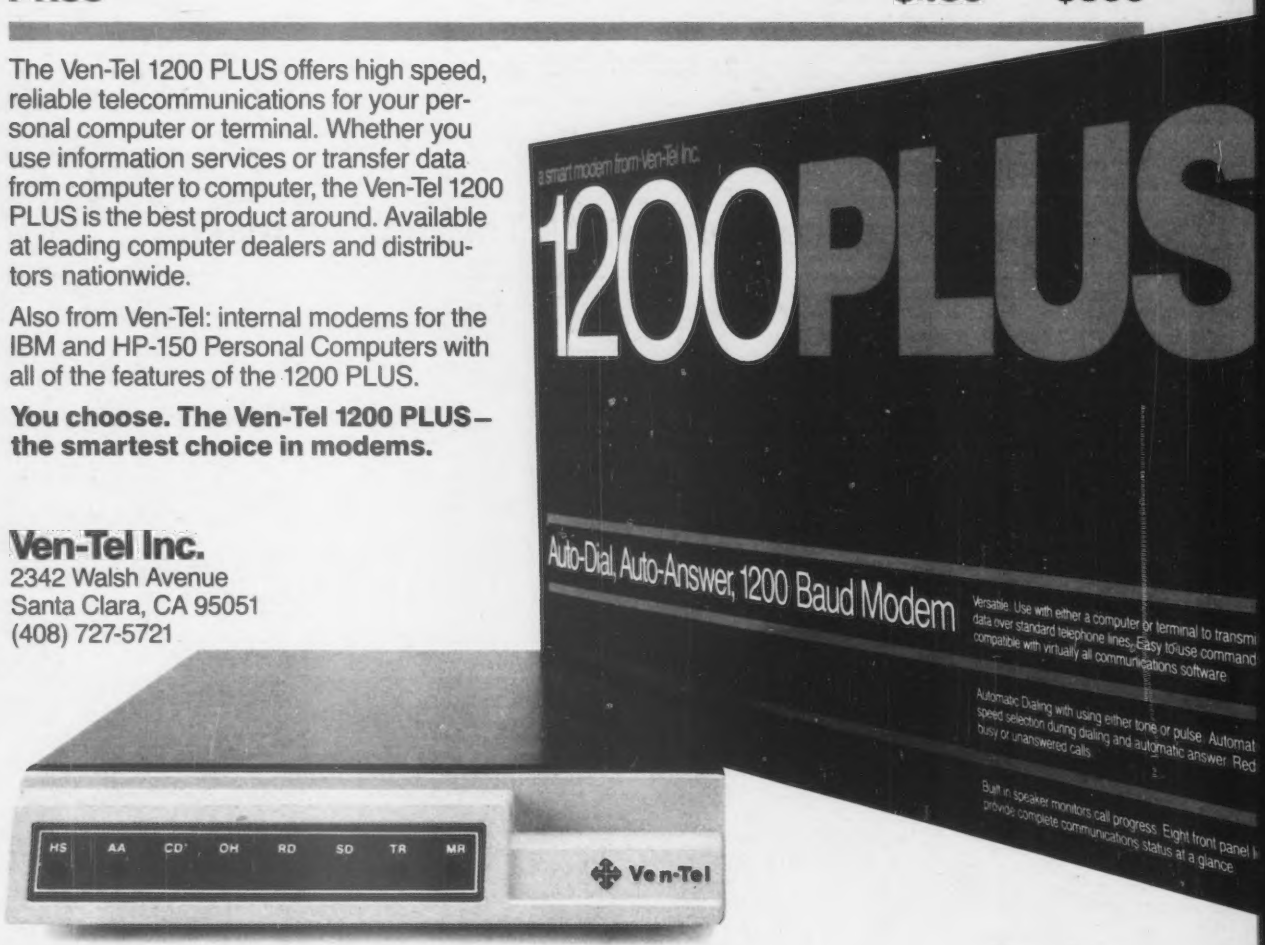

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